Agricultural Outlook Forum 2001

Speech Booklet 4

Friday, February 23

For release 7:00 a.m., February 23

8:15 COTTON: U.S. OUTLOOK AND FOREIGN PRODUCTION AND USE TRENDS
New Developments in Foreign Cotton Production and Consumption
Terry Townsend, Executive Director, International Cotton Advisory Committee

Reading Fundamentals from the Cotton Futures Market
Peter M. Egli, President, Volcot America, Inc.

8:15 GRAINS AND OILSEEDS OUTLOOK
World Oilseed Outlook
Larry J. Greenhall, Senior Vice President, Louis Dreyfus Corporation

8:15 OUTLOOK FOR MILK AND DAIRY PRODUCTS
New Developments in Dairy for 2001
Peter Vitaliano, Vice President, Economic Policy and Market Research, National Milk Producers Federation

8:15 EMERGING WATER QUALITY ISSUES: NEW TECHNOLOGY, POLICIES, APPROACHES
Environmentally Superior Waste Management Technologies
C.M.(Mike) Williams, Director, Animal and Poultry Waste Management Center, North Carolina State University

Comprehensive Nutrient Management Plans: Policy and Prospects
Thomas W. Christensen, Director, animal Husbandry and Clean Water Programs Division, USDA

Water Quality Issues Facing Agriculture and Rural Communities
Tony Prato, Professor of Resource Economics and Management, University of Missouri-Columbia

10:30 SUGAR AND SWEETENERS: FUTURE SUGAR POLICY NEEDS FOR THE DOMESTIC INDUSTRY
Sugar Policy Needs of Louisiana Cane Growers and Processors
Dean A. Gravois, President, Dean A. Gravois Farms, Inc.

Government Policy Concerns
Thomas McKenna, President, United Sugars Corporation

10:30 AGRICULTURE COMES TO GRIPS WITH AIR QUALITY STANDARDS
Animal Production and Air Quality
John M. Sweeten, PhD, P.E., Professor and Resident Director, Texas A&M University Agricultural Research and Extension Center

12:45 FRUIT AND VEGETABLES LUNCHEON
The Outlook for Nutraceuticals and Functional Foods
Karen Lapsley, Director of Scientific Affairs, Almond Board of California

2:15 TOBACCO ADAPTS TO DROPPING CONSUMPTION AND NEW MARKETING STRATEGIES
Tobacco Issues Contracting and use of Tobacco Settlement Payments
Kelly Tiller, Assistant Professor, Agricultural Policy Analysis Center, The University of Tennessee

2:15 HOW WILL RURAL AMERICA, AGRIBUSINESS, AND GOVERNMENT ADAPT TO STRUCTURAL CHANGE?
Implications of Structural Change for Farms and Rural Economics
Stanley R. Johnson, Vice Provost for Extension, Iowa State University

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New Developments in Non-US Cotton Production and Consumption *

Terry P. Townsend
Executive Director

Overview

The world cotton industry is growing slowly, and consumption is estimated at more than 91 million bales this season and about 93 million bales in 2001/02. Production will be less than consumption this season and probably again in 2001/02. The major developments affecting consumption are slower growth in world population and income compared with previous decades, and stronger competition from chemical fibers. Over the next two seasons, the largest growth in mill use is expected in India, Pakistan, Turkey, Mexico, Brazil, and China (Mainland); reductions in mill use are expected in the EU and East Asia. The most important long-term development affecting world production is that yields in most countries are not rising.

Population and Income Growth Slowing

The average rate of growth of retail-level fiber consumption has declined over the last three decades, from 3.7% during the 1960s, to 3.1% during the 1970s, 2.5% during the 1980s and 2.4% in the 1990s. Lower rates of world fiber consumption are mainly associated with slower growth in world GDP (from 5.3% during the 1960s, to 3% during the 1990s) and slower world population growth (from 2.1% during the 1960s, to 1.7% during the 1990s). World fiber consumption is projected to grow at an annual average rate of just 1.9% this decade and reach 59 million tons (270 million bales) by 2010.

World cotton consumption increased by 4.6% to nearly 91 million bales in 1999/00, and cotton use is projected to increase by 0.5% this season and by an additional 2% to 93 million bales in 2001/02. However, the consumption of non-cotton fibers is rising faster than cotton, and as a result, cotton's share of the textile fiber market declined from 41.4% in 1998 to an estimated 40.7% in 2000. World cotton consumption is projected to increase at an average annual rate of 1% during this decade and reach 101 million bales in 2010. Non-cotton fiber consumption is projected to increase at a rate more than twice that of cotton, reaching 172 million bales in 2010. Consequently, cotton's share of world fiber mill use is estimated at 37% in 2010.

Chemical Fiber Prices Below Cotton

There are several reasons for the decline in cotton's share of world fiber mill use. Government policies in China (Mainland), India, Indonesia and elsewhere explicitly encourage increased use of chemical fibers. Chemical fibers are superior to cotton in certain uses, particularly industrial uses and floor coverings. Chemical fiber prices are generally lower than prices of cotton. A ratio of the Cotlook A Index to a weighted average of polyester, rayon and wool prices fell from 1.3 in the mid-1970s to 0.7 in the late 1980s, a period when cotton's share of world fiber mill use rose slightly to about 50%. However, the

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- Paper presented to the Beltwide Cotton Economics and Marketing Conference, January 12, 2001, Anaheim, CA.

- The International Cotton Advisory Committee is an association of 43 governments of countries with an interest in cotton. The Secretariat of the Committee publishes information related to world cotton production, supply, demand and prices, and provides technical information on cotton production technology. Detailed statistics are found bimonthly in *COTTON: Review of the World Situation*, $150 per year. A monthly outlook by fax is also available for $250 per year or on the Internet for $200 per year. Access to the latest estimates of world cotton supply and use by the Secretariat is also available on the Internet for $1,500 per year.

cotton/non-cotton price ratio trended up in the 1990s and is estimated at 0.9 in 2001, and cotton's market share is declining.

Consumption Rising in Developed Countries

Most of the increase in world cotton consumption at the end-use level is occurring in industrial countries, while increases in cotton mill use are taking place in developing countries. As a consequence, net imports of cotton textiles by industrial countries are estimated to have increased from 25 million bale equivalents in 1998 to 27 million in 1999. In 1999, developing countries accounted for 76% of world cotton mill use and 43% of end-use cotton consumption. Industrial countries accounted for 20% of world cotton mill use and 50% of end-use cotton consumption.

The largest source of retail level demand for cotton in the world is the USA. Net domestic consumption (mill use of cotton plus the cotton textile and apparel trade balance) in calendar 2000 is estimated at 21 million bales, an increase of 3% over 1999 and double the level of retail sales in 1986. U.S. consumers account for 22% of world cotton consumption, and on a whole-trade pipeline basis, the U.S. is a net cotton importer of about three million bales.

Lower fiber prices and better world economic performance are fueling the current rise in world fiber consumption, including the rise in cotton use. Changes in fiber prices tend to affect end-use textile fiber consumption with a lag of one year, and average fiber prices declined by 30% during 1998 and 1999, helping to fuel the growth in cotton consumption of more than 4% in 1999/00. Average textile fiber prices rose by 9% in 2000, and growth in consumption is slowing this year.

World GDP increased by 3.4% in 1999 and 4.7% in 2000, contributing substantially to the rapid rise in cotton use last season. The world economy is still growing at an above-average rate, and the current IMF estimate of world GDP growth this season is 4.2%, slower than last year but still above average, helping to boost cotton use.

Mill Use Linked to Production

Consumption in India is sensitive to changes in domestic cotton production. The national average yield in India reached 280 pounds per acre in 1989/90, rose by only 5% over the next seven years and is estimated lower at 250 pounds per acre this season, only a little higher than in the early 1990s. Production declines have been the most pronounced in North India because of disease and insect resistance to pesticides, and the yield failures are occurring despite efforts to improve the technology used by farmers. Because of the systemic nature of the problems affecting yields in India, a substantial rise in production to the level of consumption is not expected this decade, and India will likely be a net cotton importer in most years.

The estimate of 2000/01 Indian production, with harvesting in the South barely beginning, is less than 11 million bales, one million bales less than last season and nearly three million bales less than in 1996/97. The decline in production is resulting in increases in domestic prices of between 15% and 25% compared with last year. Imports rose to 1.8 million bales in 1999/00 and the estimate for this season is 1.4 million bales. These are the highest levels of imports for India since the 1950s. Indian cotton use reached 13.1 million bales in 1996/97, but as a consequence of lower production, consumption has not grown since and is estimated at 13.2 million bales this season. With higher domestic prices there will probably be an increase in area and production in India over the next two years, and consumption is estimated at 13.7 million bales by 2002/03.

Like India, cotton use in Pakistan was constrained by a decline in domestic production during the 1990s, and consumption last season of 7.3 million bales was no higher than in 1993/94. Disease and difficulties controlling insects depressed yields and production in Pakistan during the 1990s, but there has been progress developing new varieties tolerant of the leaf curl virus and production last season rose to 7.8 million bales, the highest since 1995/96. Cotton use is rising in Pakistan this season because of ample domestic supplies following the rise in production last season. Use in 2000/01 is estimated at a record of 7.5 million bales, an increase of 150,000 bales, and consumption is forecast to rise to 7.8 million bales over the next two seasons.

Cotton production in Turkey has been between 3.5 and 4.1 million bales the last six seasons as increased area in the irrigated Southeast region has offset declining production in other regions because of

SUPPLY AND DISTRIBUTION OF COTTON

February 14, 2001

Years Beginning August 1

	1996	1997	1998	1999 Est.	2000 Proj.	2001 Proj.
	Million 480-Lb. Bales					
BEGINNING STOCKS						
WORLD TOTAL	41.006	43.330	45.733	45.416	40.79	36.1
CHINA (MAINLAND)	17.061	18.381	19.736	18.941	12.92	10.4
USA	2.609	3.971	3.887	3.939	3.92	4.3
NET EXPORTERS	16.574	17.941	18.618	18.598	18.93	17.2
NET IMPORTERS 1/	24.432	25.390	27.115	26.819	21.86	18.9
PRODUCTION						
WORLD TOTAL	90.019	92.102	86.062	86.444	86.95	91.7
CHINA (MAINLAND)	19.304	21.136	20.673	17.587	19.98	20.2
USA	18.942	18.793	13.918	16.968	17.22	18.4
INDIA	13.890	12.337	12.883	12.180	10.79	11.9
PAKISTAN	7.319	7.171	6.798	7.808	7.81	7.3
UZBEKISTAN	4.877	5.229	4.591	5.180	4.27	5.1
TURKEY	3.601	3.849	4.052	3.634	3.44	3.8
OTHERS	22.085	23.588	23.148	23.087	23.43	25.0
CONSUMPTION						
WORLD TOTAL	88.697	88.899	86.700	90.738	91.64	93.3
CHINA (MAINLAND)	21.587	21.587	21.128	22.046	22.97	23.4
INDIA	13.154	12.678	12.775	13.497	13.20	13.4
EU, C. EUR. & TURKEY	11.491	11.813	10.813	11.397	11.51	11.7
USA	11.126	11.349	10.403	10.240	9.53	9.4
EAST ASIA & AUSTRALIA	9.579	8.826	9.030	9.673	9.52	9.5
PAKISTAN	7.002	7.088	7.027	7.349	7.46	7.6
BRAZIL	3.626	3.596	3.773	4.063	4.18	4.4
CIS	1.863	2.046	2.067	2.469	2.86	3.0
OTHERS	9.269	9.915	9.683	10.005	10.40	10.9
EXPORTS						
WORLD TOTAL	27.783	27.148	24.718	28.091	27.96	29.0
USA	6.865	7.500	4.345	6.750	7.35	8.7
UZBEKISTAN	4.786	4.823	4.134	4.134	3.64	4.2
FRANCOPHONE AFRICA	3.301	3.783	3.873	3.724	3.08	3.6
AUSTRALIA	2.386	2.641	3.033	3.199	3.24	3.2
GREECE	0.896	0.859	1.056	1.350	1.38	1.1
ARGENTINA	1.330	1.010	0.751	0.367	0.50	0.7
CHINA (MAINLAND)	0.010	0.028	0.677	1.699	0.46	0.3
IMPORTS						
WORLD TOTAL	28.150	26.409	24.890	27.931	27.96	29.0
EAST ASIA & AUSTRALIA	9.170	8.233	8.972	9.399	9.15	9.3
EU, C. EUR. & TURKEY	7.444	7.798	6.851	7.257	7.21	7.1
SOUTH AMERICA	2.909	2.670	2.177	2.471	1.77	1.2
CIS	0.945	1.253	1.210	1.543	1.79	1.8
CHINA (MAINLAND)	3.613	1.834	0.337	0.138	0.92	2.1
TRADE IMBALANCE 2/	0.367	-0.739	0.172	-0.160	0.00	0.0
STOCKS ADJUSTMENT 3/	0.635	-0.061	0.148	-0.168	-0.03	0.0
ENDING STOCKS						
WORLD TOTAL	43.330	45.733	45.416	40.794	36.07	34.4
CHINA (MAINLAND)	18.381	19.736	18.941	12.919	10.39	8.9
USA	3.971	3.887	3.939	3.922	4.29	4.5
NET EXPORTERS	17.941	18.618	18.598	18.930	17.16	17.2
NET IMPORTERS 1/	25.390	27.115	26.819	21.863	18.92	17.3
ENDING STOCKS/USE 4/	0.43	0.41	0.40	0.38	0.38	0.39
COTLOOK A INDEX 5/	78.60	72.20	58.90	52.80	63*	70*

1/ Includes Brazil, China (Mainland), Colombia, Greece, Mexico, Turkey and traditional importers

2/ The inclusion of linters and waste, changes in weight during transit, differences in reporting periods and measurement error account for differences between world imports and exports.

3/ Difference between calculated stocks and actual; amounts for forward seasons are anticipated

4/ World-less-China (Mainland) ending stocks minus China net exports, quantity divided by world-less-China consumption

5/ U.S. Cents per pound. Not a model result for 2000/01. The estimate for 2001/02 is based on net China (Mainland) trade and world-less-China (Mainland) ending stocks to use.

*/ 95% confidence interval extends 12 cents above and below the point estimate

competition with food crops. Production in 2001/02 is estimated in the middle of the range at 3.8 million bales. Exports to Russia compose a significant portion of demand for the Turkish textile industry. Mill use of cotton in Turkey reached 5.3 million bales in 1997/98, but dropped below five million bales in 1998/99 after the devaluation of the Russian rouble. Consumption is recovering to 5.3 million bales again this year, and the estimates for the next two seasons are 5.5 million and 5.6 million bales.

Textile Exports Fueling Expanded Mill Use

Cotton use in Mexico is now essentially an extension of the US cotton industry, and mill use this season is estimated at 2.5 million bales. Cotton area will expand in Mexico this year because of higher cotton prices, and with strong economic growth in North America, cotton use in Mexico is forecast at three million bales by 2002/03. Investment in textile capacity is continuing in Mexico as well as in Canada.

Cotton use in Brazil is estimated at a record of 4.2 million bales in 2000/01, demonstrating again the power of currency devaluation and sound macroeconomic management to spur export-led economic growth. Increased domestic cotton production is providing an expanded supply for the local industry. Between 1995/96 and 1999/00, cotton production in Mato Grosso climbed from 150,000 bales to 1.5 million, rising from a small portion of the Brazilian total to now account for more than half. Production in Mato Grosso alone is estimated at two million bales in 2000/01, and production in Brazil is estimated at 3.9 million bales. As farmers have gained experience with cotton in Mato Grosso, the state lint yield has more than doubled and was 1,400 pounds per acre in 1999/00, possibly the highest average yield in a rainfed area in the world. Over the next two seasons production in Brazil is forecast to rise to nearly five million bales and consumption will climb to an estimated 4.5 million bales, meaning that Brazil will once again be a significant exporter. Production is also recovering in Argentina and Paraguay because of higher market prices, and production in South America is estimated at 5.8 million bales in 2000/01, and six million next season.

Higher Prices Leading to Increased Area

Production in the Southern Hemisphere is estimated at 9.5 million bales this season and about the same next season. Production in Australia is estimated at 3.3 million bales this season and 3.5 million next season as area continues to expand with higher cotton prices. Production in Zimbabwe is rising to a record of nearly 600,000 bales this season with very high yields. Production could be closer to 500,000 bales next season, assuming average yields. Cotton use in East Asia and Australia is holding at the same aggregate level of the last five years of about nine million bales. Consumption in Japan is continuing downward, but there are increases in Thailand and Hong Kong.

2000/01 cotton use in the EU and Central Europe is estimated about the same as last season at 5.2 million bales and 900,000 bales, respectively. Production in Greece and Spain is estimated at 2.3 million bales this season and 2.2 million bales next season. A gradual decline in EU cotton area is expected over the next decade because of reductions in the income subsidy. EU cotton production rose from 450,000 bales in the early 1980s to a record of 2.5 million bales in 1999/00, but domestic use is still larger than production and net imports are about three million bales.

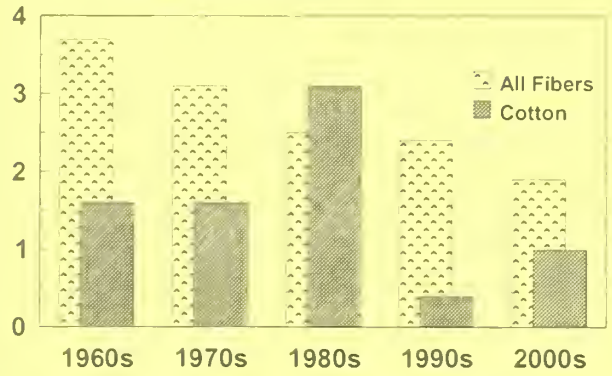
Currency Devaluation Aiding CIS Cotton Use

Consumption in the Commonwealth of Independent States is climbing to an estimated three million bales, including 1.5 million bales in Russia in 2000/01 because of higher government purchases of textile products and reduced competition from imports following the currency devaluation in 1999. The breakup of the USSR and the COMECON trading block resulted in a subtraction from world cotton consumption after 1991 of approximately nine million bales, a principle reason that world cotton use did not rise during the 1990s.

The rise in cotton use in the CIS is occurring without the benefit of rising production in Central Asia. Yields in Uzbekistan averaged 860 pounds per acre in the late 1980s and fell during the 1990s as input supplies were disrupted and incentives continued to weaken. The Uzbek yield this season is estimated at less than 600 pounds per acre, roughly on par with yields in the 1950s. Production in Uzbekistan is dropping to an estimated 4.3 million bales in 2000/01, probably the smallest harvest in Uzbekistan in about four decades. Normal weather will presumably lead to increased production next season, as the government will try to maintain cotton production near five million bales per year. Production in the CIS is

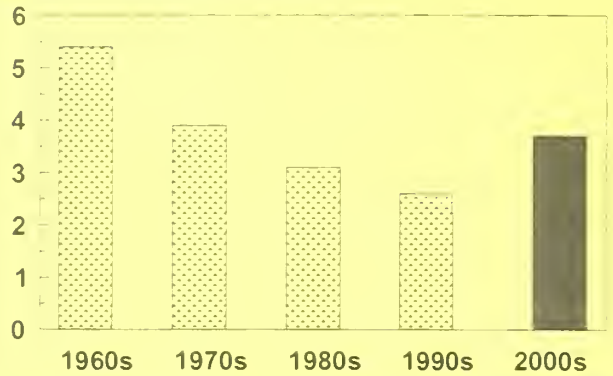
FIBER CONSUMPTION GROWTH

Annual Average % Change



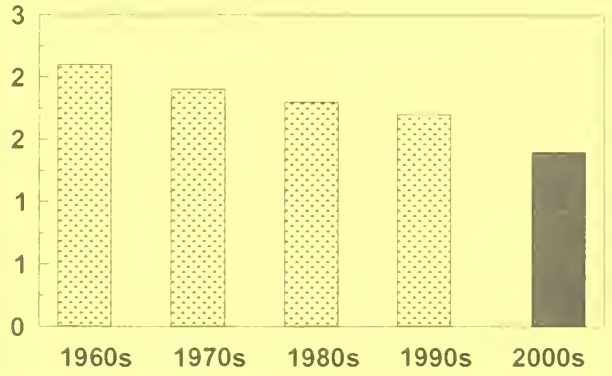
WORLD GDP GROWTH

Annual Average % Change



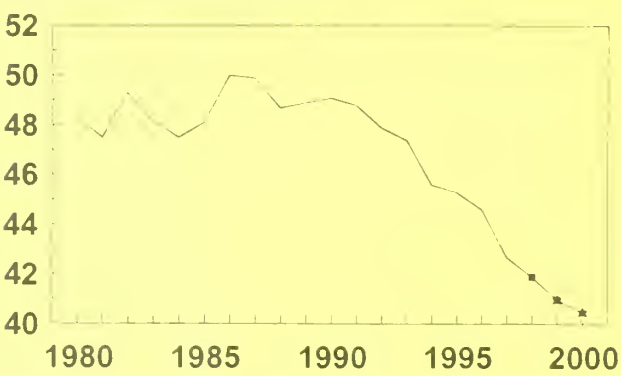
WORLD POPULATION GROWTH

Annual Average % Change



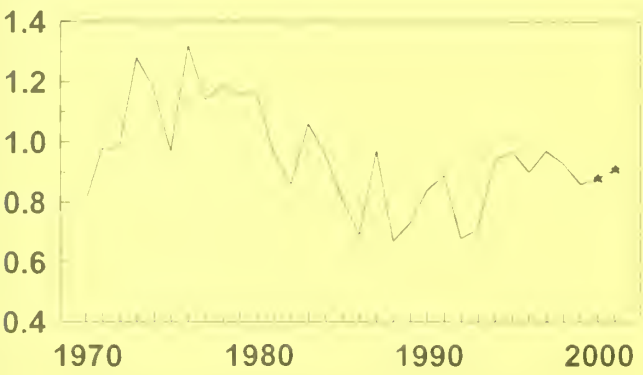
COTTON'S MARKET SHARE

Percent of Fiber Use



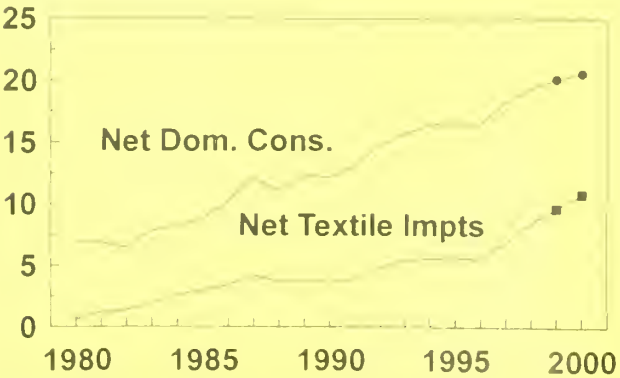
COTTON/NON-COTTON PRICES

Ratio



U.S. COTTON CONSUMPTION

Million Bales



estimated at 6.3 million bales this season and seven million next season. Production in the USSR used to average 12 million bales.

Yields in Francophone Africa reached approximately 420 pounds per acre in 1990/91 but fell during the 1990s, and the regional yield this season is less than 300 pounds per acre. Poor weather and low prices, which discourage harvesting, are contributing to a steep drop in yields this season, but difficulty controlling insects and an expansion of area have also affected production. Production in Francophone Africa is estimated at 3.3 million bales this year, and even with no growth in area, production is projected to rise to four million bales next year with better yields. The availability of unused land, the provision of cotton inputs to greater numbers of farmers, and an expansion of planted area per farm family contributed to increases in area and production during the 1980s and 1990s. But an overvalued currency that reduces prices paid to farmers, disruptions to the cotton system because of privatization and agronomic problems associated with insect control are leading to long-term difficulties.

No Gain in World Yield

Despite surging production in Western Brazil and East Turkey, 2000/01 is the ninth consecutive year in which the world yield is lower than the record of 533 pounds set in 1991/92. The world yield this season is estimated at 520 pounds per acre. In contrast, from the end of World War II until the 1990s, the world cotton yield rose at an average rate of 2% per year and never went more than three years without reaching a new record.

The significance of the decline in the world yield is shown by the history of world cotton area since 1950/51. Since the 1940s, world cotton area has been in a range between 72 million and 89 million acres, with no obvious tendency either higher or lower. World area is estimated at 80 million acres this season, and a rise to 85 million acres is projected for 2001/02 with the rise in cotton prices this season. Cotton prices rose marginally faster than wheat, corn and soybean prices during 2000, and cotton prices are very attractive relative to rice prices. Increased area is expected in China (Mainland) and India in response to higher domestic prices. Rising international prices may encourage increased area in the Southern Hemisphere and Francophone Africa.

China (Mainland) Textile Exports Surging

Consumption of cotton in China (Mainland) is rising as a national policy of stock reduction remains in effect. Production of cotton yarn is estimated at 2.9 million tons for the five months of August through December 2000, compared with 2.5 million tons during the same months of last season, an increase of 14%. Even assuming that the proportion of chemical fiber in cotton yarn is rising from an estimated 36% last season to 38% this season, mill use of cotton in China (Mainland) could be climbing from 20 million bales to 21 million bales. Adding about two million bales for use in all the non-mill categories results in an estimate of 23 million bales for total use in China (Mainland) in 2000/01, up from an estimated 22 million bales during last season. The value of textile and apparel exports from China (Mainland) expanded by 23% in 2000. Assuming that the ratio of export value to quantity of fiber use held constant, all the gain in cotton use in China (Mainland) is accounted for by the expansion in exports and retail level domestic fiber use is actually falling.

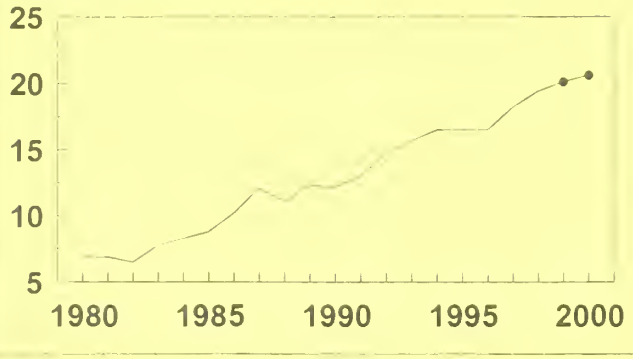
2000/01 production in China (Mainland) is estimated at 20 million bales, leaving a deficit of three million bales and prompting a forecast that China (Mainland) will need to import substantial amounts of cotton by the end of this season. Even if production reaches 20 million bales again in 2001/02, the momentum behind the rise in consumption will likely carry China (Mainland) stocks lower again, perhaps forcing imports back to the range seen in the mid-1990s.

Conclusion

After more than a decade in which world cotton use did not rise, the world industry is growing again. With consumption rising in both the CIS and China (Mainland), and growth continuing elsewhere, world consumption is forecast at 93 million bales in 2001/02. However, the world yield is not climbing, and even though prices have risen since last season, they remain below the average of the last three decades. Consequently, world production is likely to remain below consumption next season, leading to a further tightening of world stocks.

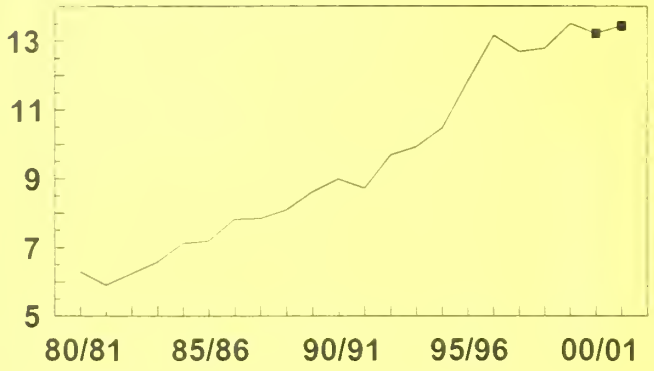
USA RETAIL COTTON CONSUMPTION

Million Bales



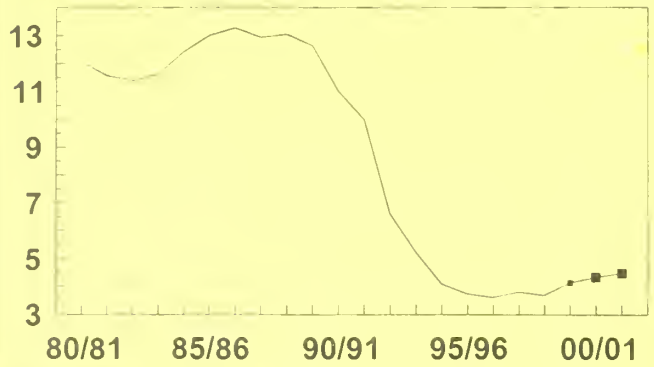
CONSUMPTION: INDIA

Million Bales



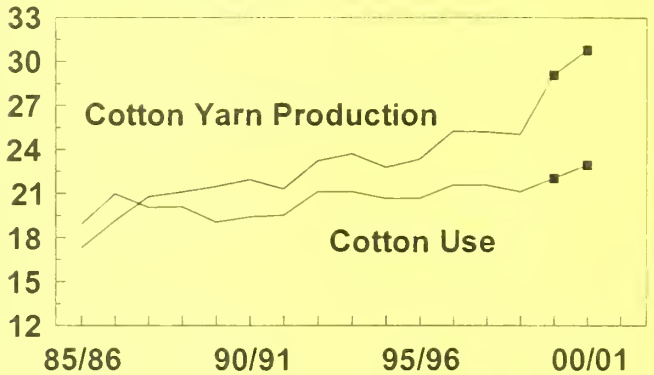
CONSUMPTION: COMECON

Million Bales



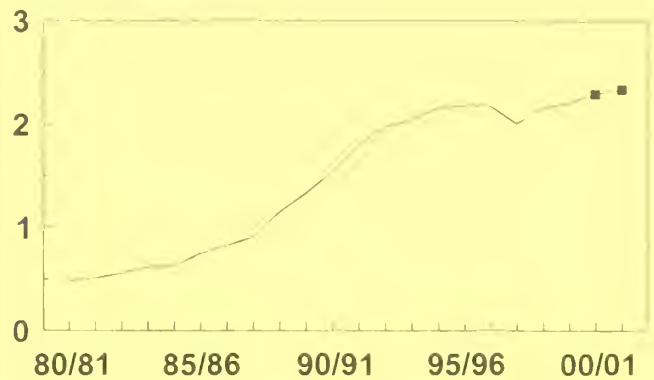
CHINA (Mainland)

Million Bales



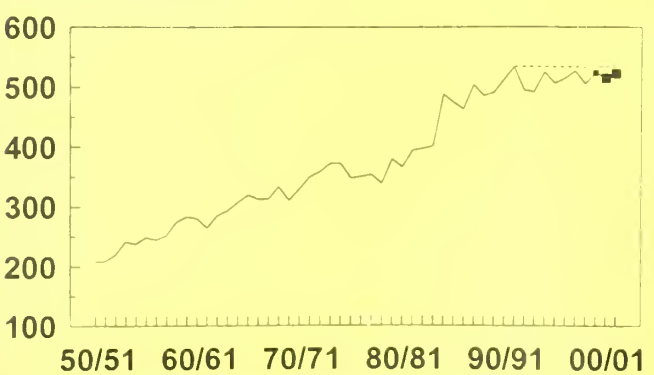
CONSUMPTION: INDONESIA

Million Bales



WORLD COTTON YIELDS

Pounds per Acre



READING FUNDAMENTALS FROM THE COTTON FUTURES MARKET

Peter M. Egli
President, Volcot America Inc.

Good morning, Ladies and Gentlemen,

First of all, I would like to thank Carol Skelly and the USDA for inviting me today. It is both a pleasure and privilege to be here.

My presentation is composed of two parts. First, I am going to talk about how we, in our company, approach fundamental analysis and what indicators we use in regards to the cotton futures market. In the second part I will take a look into my crystal ball and give you some comments on the current cotton situation.

PART 1. – A PRACTICAL APPROACH TO READING FUNDAMENTALS

"Reading Fundamentals" has the sound of clairvoyance, and fundamental analysis is indeed much more an art than a science. We may all look at the same things, but we will probably predict different outcomes of the future.

In a market economy the price of a commodity is ultimately going to follow the laws of supply and demand. In Fundamental analysis we therefore study factors related to supply and demand, such as industry, economic and weather conditions, in an effort to determine the value of a commodity. However, while the fundamentalist who knows his numbers may be right in the long run, the market often wanders off in the direction of what the majority of market participants perceives to be most relevant. Or how Immanuel Kant once said, "There's reality, and there's your conscious perception of it". That's where technical analysis comes in handy. Technical analysis with its charts illustrates market psychology and momentum, and serves as an excellent timing tool. We are therefore using fundamental analysis to define value and technical analysis to help us with the timing of individual trades.

In modern fundamental analysis there is a need to understand the dynamics. By dynamics I mean the understanding of what is going on in the market - *who* is trying to do *what, why* and *when*. In other words, the market is telling a story and we need to be able to understand the story.

So what do we look at when we try to figure out the story of the cotton futures market? First of all, I believe that it is important to know who the key players are. Once we know the players, we can start our work on trying to figure out what position they may currently hold and then spend some time anticipating what their next move may be.
In the futures market there are two main groups of players, known as the *'Trade'* and the *'Specs'* (or speculators). The *'Trade'* consists of growers, merchants and mills, whereas the *'Specs'* are made up of large commodity funds, floor traders and a large number of smaller speculative accounts.

How can we characterize these players?

Growers

- Growers typically work from a long position – their crop!
- Growers sell their crop both fixed price and on-call, typically about 30% around planting, 30% during the growing season and 40% after harvest
- They use the futures market mainly as a hedging tool
- Government programs play an important role in the growers' decision-making process (Loan, LDP)

Merchants

- Merchants are the link between growers and mills and work from both the long and the short side
- Use the futures market both as a hedging and a speculative tool, although their futures positions are reported mainly under the 'hedge' category
- Merchants are using primarily fundamental analysis, although many of them are well versed in technical analysis
- Government programs, such as the 'Step-2' export subsidy, influence their decision making
- The larger merchants sometimes use the certificated stock as leverage

Mills

- Mills typically start from a short position, which is equivalent to their mill consumption
- US mills buy a large portion of their requirement on-call, usually well before the season
- Government subsidy programs (Step-2) matter, but are not necessarily part of their buying decision
- Mills use the futures market mainly as a hedging tool

Specs

- Specs do not trade in the physical market and they do not get involved with the certificated stock
- Specs have gained in importance over the years and today make up around 50% of open interest in the futures market
- They make their investment decisions primarily based on technical analysis, often guided by computer programs
- Since Specs have to report their positions, we know exactly how much they are long and short

Now that we have identified the players, let's look at some of the reports we regularly study in our effort to understand what is driving the market.

Supply/demand reports (USDA, ICAC, NCC or Cotton Outlook)

These statistics provide the framework for our fundamental analysis. The monthly USDA report (crop estimate and US/World supply/demand report) is certainly the most important. Unexpected changes in these reports often lead to wild market swings.
The stocks-to-use ratio that we calculate from this report is another important indicator in determining whether cotton stocks are likely to be excessive, adequate or tight. I shall comment on supply/demand later in my market outlook.

I would like to add here that it is important to take the quality angle into consideration when analyzing these reports. For example, even though US ending stocks are currently rising, they are made up of rather unattractive qualities due to the fact that we three bad crops in a row. Therefore, ending stocks of premium quality cotton may actually be less than last season.

Weather reports

Weather is one of the key ingredients to the production side of the equation. Weather changes quickly and we therefore need to watch it closely, especially between planting time and harvest. Thanks to the Internet we have a vast amount of weather reports and satellite pictures available from all over the globe that help us to stay informed up-to-the-minute.

Economic indicators

US world and economic reports, such as GDP, retail sales, consumer confidence etc. may alert us to changes related to the supply and demand of cotton. For example, a drop in consumer confidence may negatively affect demand down the road. I shall talk about some of these indicators in more detail in my market outlook.

Government programs

We need to be aware of what government programs exist, how they work, how they change and how they may influence the market. Under the old farm bill the government loan presented strong price support at around 52.00 cents, but newer programs like the LDP (or Loan Deficiency Payment) and POP (Producer Option Payment) are mechanisms that can circumvent this support. Another government program of importance today is the Step-2 export and mill subsidy, which needs to be taken into consideration when comparing US with foreign prices.

US domestic mill consumption report (M22P)

This report shows us the pace of US mills consumption. However, since the beginning of NAFTA, it has lost some of its importance. Rather than just looking at US consumption, we need a report that includes Mexico and Canada, since many US mills have shifted part of their production across the border.

Weekly export sales report

This report tells us a great deal about how competitive US cotton is in the world market. Strong export sales are a sign that the current price is fairly attractive to mills around the globe and that we may expect prices to remain stable or go higher. On the other hand, slow export sales usually spell trouble, meaning that the price needs to go lower in order to attract buyers.
However, in a season like this, where the quality in the crop is much lower than usual, export sales may be weaker for the simple reason that mills are not able to buy what they are looking for. We have long maintained that expectations for US exports were much too optimistic and we feel that the final number will be around 6.7 mio bales for the current marketing year.

A-Index by Cotton Outlook

Like the US export sales report, the daily A-index tells us a lot about the competitiveness of US versus foreign cotton. The A-index, measuring world cotton prices, is the cousin of the US futures market, with

the exception that it is not exchange traded (although it is traded in private Swap markets, and some futures exchanges are currently looking at the possibility of launching a world contract based on the A-index).
The A-index is also used for the calculation of many US government subsidies, such as the POP or LDP payments as well as the Step-2 export and mill subsidy.

Spec/hedge report

This weekly report by the New York Board of Trade gives us a look at market dynamics, because it contains valuable information about how the futures positions of both Trade and Specs change from week to week. While the Trade's futures position is only a part of its overall market position, the Specs' futures position represents 100% of their market exposure. Therefore, by analyzing how many contracts the Specs own both on the long and short side, we can anticipate what future action we may see from them. For example, if the Specs are heavily net long, it represents future selling pressure, because these Specs sooner or later will have to sell out of their longs in order to lock in profits or to stop losses. However, it is important to not only look at the net spec long or short position in terms of a percentage figure, but to actually look at how many absolute contracts are in play on both the long and short side.

On-call report

This report is another indicator of market dynamics, telling us how many bales growers and mills have yet to buy and sell based on the price of the futures market. Like the spec/hedge report, it tells us something about what future action we may expect, in this case from growers and mills. For example, if mills still have to fix 4.8 mio bales, but growers have only 1.9 mio bales unfixed, the difference of 3.0 mio bales represents potential price support somewhere in the future. If the opposite positions were the case, it would represent potential selling pressure.

Open interest and daily clearance sheet of futures and options

Here are two more indicators of market dynamics. By looking at what happened in the futures market the day before and how it affected open interest, we get a better understanding of who was driving the market.

Certificated stock

Over the last decade, the certificated stock has become a more important factor in the market than it should be. Intended to be the market's keeper of true value, the delivery contract unfortunately has some serious flaws in its current version. Let me explain! The cotton futures contract was originally designed to function primarily as a price index that discourages physical delivery by making the delivery process costly and by setting high delivery standards. However, what may have been a high standard some 10 or 15 years ago, no longer is. For example, the contract allows cotton with strength readings as low as 22 g/tex to be delivered, and what makes matters really bad is that there is no discount charged to these low strength bales. In other words, the futures contract pays the same price for a 22 grams-per-tex bale of cotton as it does for a 30 g/tex bale, when the spot market clearly makes a difference of some 6 or 7 cents/lb between these two qualities. Similar discrepancies exist in the micronaire category, where 4.8 or 4.9 readings are treated equal to superior 3.8-4.5 readings, although there is a difference of several cents in the spot market. And as if these discrepancies were not enough, the contract sometimes gets burdened with sticky cotton from Arizona or Texas. Therefore, the certificated stock has become a dumping ground for undesirable cash cotton, which often depresses the futures price beyond reason and makes its

primary function as a hedging tool questionable. Reform is therefore urgently needed in order to restore the tarnished image of the futures contract. In the meantime, we have to be aware of the fact that when we are buying a futures contract, we are potentially buying a bale of sticky cotton from West Texas, with very low strength and relatively high micronaire readings.

Technical indicators

As mentioned earlier, technical indicators are helping us with the timing of our trading decisions. We therefore believe that at a minimum we should be aware of where some of the technical support and resistance levels are. Based on how the market behaves when it approaches these levels gives us a good sense of what mood the market is in.

I would now like to finish my first part with an example and at the same time set the stage for my market outlook by taking a look at what happened to the market in December and January. Based on our fundamental analysis back in November, we had a fairly bullish outlook on prices. The USDA projected a worldwide supply deficit of some 4.5 mio bales for the current season and the stocks-to-use ratio was declining. On top of that, the quality outturn of the world crop was one of the lowest in years. The market seemed to agree with this bullish outlook as well, because it had climbed from 52 to 68 cents between July and November. However, by the middle of December there were suddenly a few clouds showing up on the horizon. First, the spec/hedge report told us that speculators had increased their net long position to 35% of open interest. Second, the weekly export reports told us that mills resisted these high prices and that the pace of weekly export sales had slowed considerably over the past few weeks. Third, the A-index had stalled out at around 67.00 cts/lb and actually started to drift lower. Fourth, the certificated stock kept increasing steadily to over 260'000 bales, with more undesirable cotton being added. Fifth, several technical indicators told us that the bull market was starting to look tired.
So there were at least five red flags alerting us to a potential trend change. All that was needed was a trigger, an excuse for the market to sell off. It came in the form of a double whammy around Christmas, when a lousy US mill consumption number was followed by a report that China's crop had officially been raised by 2.0 mio bales. The result was a 10 cents decline between Christmas and the end of January.

That brings me to the second part of my presentation – an attempt to answer the question "Where does the market go from here?"

PART 2. – MARKET OUTLOOK

My market outlook will be available on February 23, 2001.

Reading Fundamentals From The Cotton Futures Market

Peter Egli
Volcot America, Inc.

Fundamental Analysis

- More art than science
- Definition = Study of supply/demand
- Reality vs. Perception
- Technical analysis = timing
- Dynamics -Who? Why? What ? and When?

Who are the Players?

Growers

- Always long = crop
- Sell some of their crop on-call
- Futures market a hedging tool
- Government programs play huge role in their decisions

Merchants

- Work from long and short side
- Use mainly fundamental analysis
- Government programs (Step-2) important
- May use Certificated Stock as leverage

Mills

- Always short = mill consumption
- Buy large portion on-call
- Government programs (Step-2) important
- Futures market a hedging tool

Specs

- Do not trade physical cotton, nor Cert.Stock
- Make up about 50 % of futures market
- Use primarily technical analysis
- Spec/hedge report reveals their exact position

Cotton Fundamentals

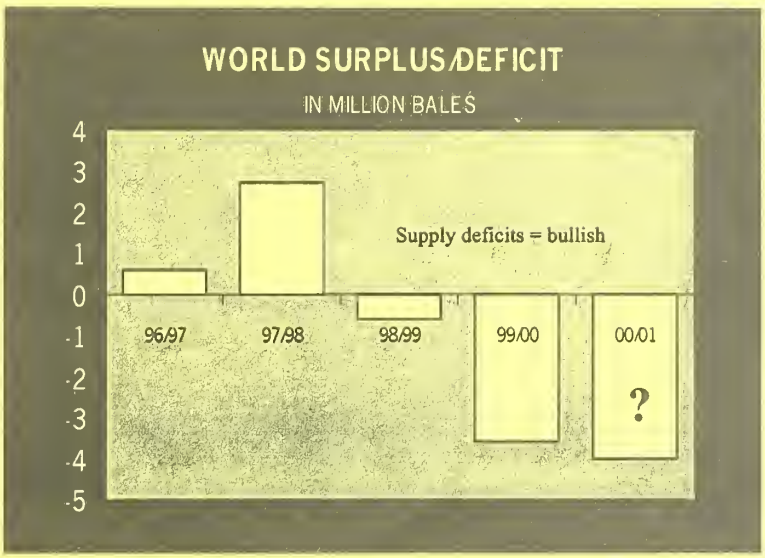
- Supply/demand reports
- Weather
- Economic indicators
- Government programs
- Domestic mill report
- Weekly export sales

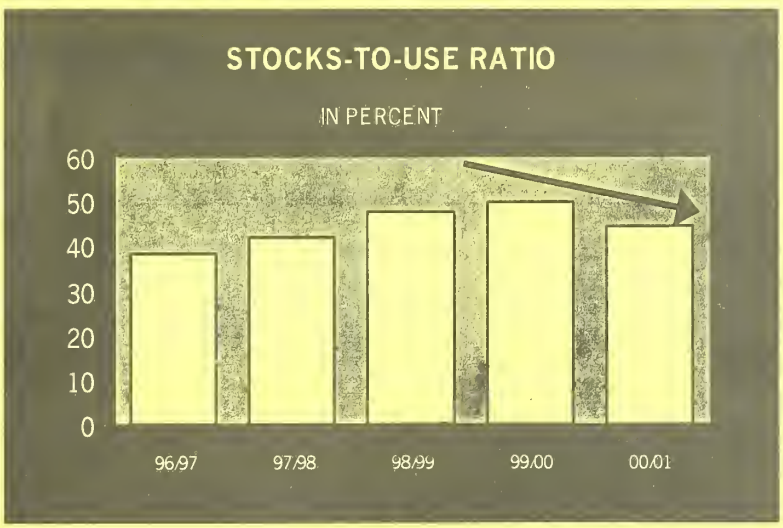
Cotton Fundamentals

- A-index
- Spec/hedge report
- On-call report
- Open interest/Clearance sheet
- Certificated stock
- Technicals (support/resistance)

Market Outlook

- Statistics bullish, but market falls
- Was it just the shift in the net spec position?


WORLD SURPLUS/DEFICIT
IN MILLION BALES
4
3
2
1
0
-1
-2
-3
-4
-5
Supply deficits = bullish
96/97
97/98
98/99
99/00
00/01
?


STOCKS-TO-USE RATIO
IN PERCENT
60
50
40
30
20
10
0
96/97
97/98
98/99
99/00
00/01

Market Outlook

Long term

- Economic slowdown?
- 2001/02 production increase?
- China

Market Outlook

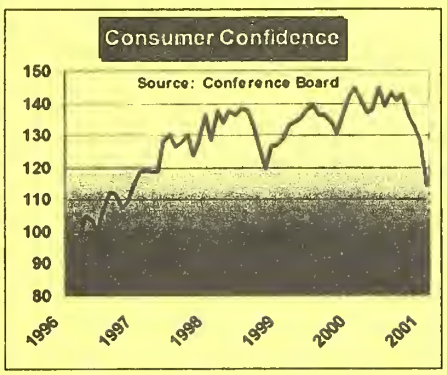
Short term

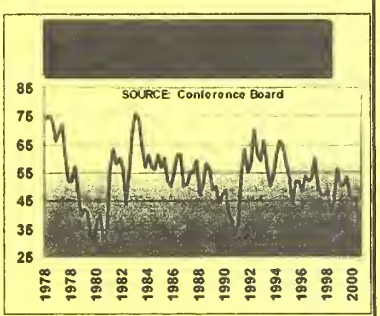
- Cert.Stock poker play
- China imports?
- Southern Hemisphere crops

CONCLUSION?

"Spring and summer were rather slow
but I think I'm in for a great fall."

Will Demand hold up?





Spec/hedge report

SPECULATION						
	LONG	ACC'TS	%	SHORT	ACC'TS	%
Customers	26,142	1,086	35.7%	37,232	1,143	50.8%
House	4,272	53	5.8%	1,507	54	2.1%
Total	30,414	1,139	41.5%	38,739	1,197	52.9%
= 3.0 mio bales			HEDGING			= 3.9 mio bales
	LONG	ACCTS	%	SHORT	ACCTS	%
Customers	38,749	389	52.9%	22,828	203	31.2%
House	4,068	8	5.6%	11,664	6	15.9%
Total	42,817	397	58.5%	34,492	209	47.1%
GRAND TOTAL	*73,231*	*1,536*	*100.0%*	*73,231*	*1,406*	*100.0%*

= 7.3 mio bales

Futures Based On:	Call Cotton Based New York: Unfixed Call Sales	Change From Prev. Week	Unfixed Call Purchs.	Change From Prev. Week	Open Futures Contracts - New York Cotton Exchange: At Close 2/2/01	Change From Prev. Week
March '01	2,108	-11	3,173	-1,689	29,097	-2,729
May '01	6,764	-110	6,208	1,291	20,816	2,906
July '01	16,222	-848	2,662	229	11,353	1,007
October '01	1,518	-23	445	57	1,106	22
December '01	3,684	407	1,636	9	10,978	171
March '02	9,226	555	5,000	0	915	231
May '02	3,322	378	15	15	397	133
July '02	5,062	580	0	0	301	10
October '02	224	0	0	0	5	0
December '02	186	159	142	0	14	0
Totals:	48,316	1,087	19,281	-88	74,982	1,751

= 4.8 mio bales = 1.9 mio bales

WORLD OILSEED OUTLOOK

USDA AGRICULTURAL
OUTLOOK FORUM 2001
February 22-23, 2001

LARRY J. GREENHALL

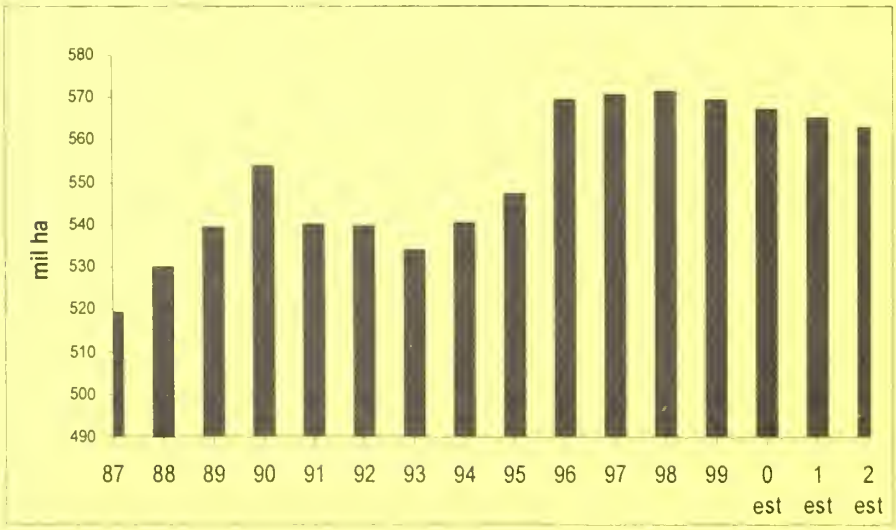
Major changes occurring in oilseed complex

- Acreage Shifts
- Expanding Demand

Acreage shifts

- Stagnant growth in agricultural land since 1996, when high prices and changes in U.S. Ag policy resulted in large growth of planted acreage

World Total Acreage
(Major Producers)

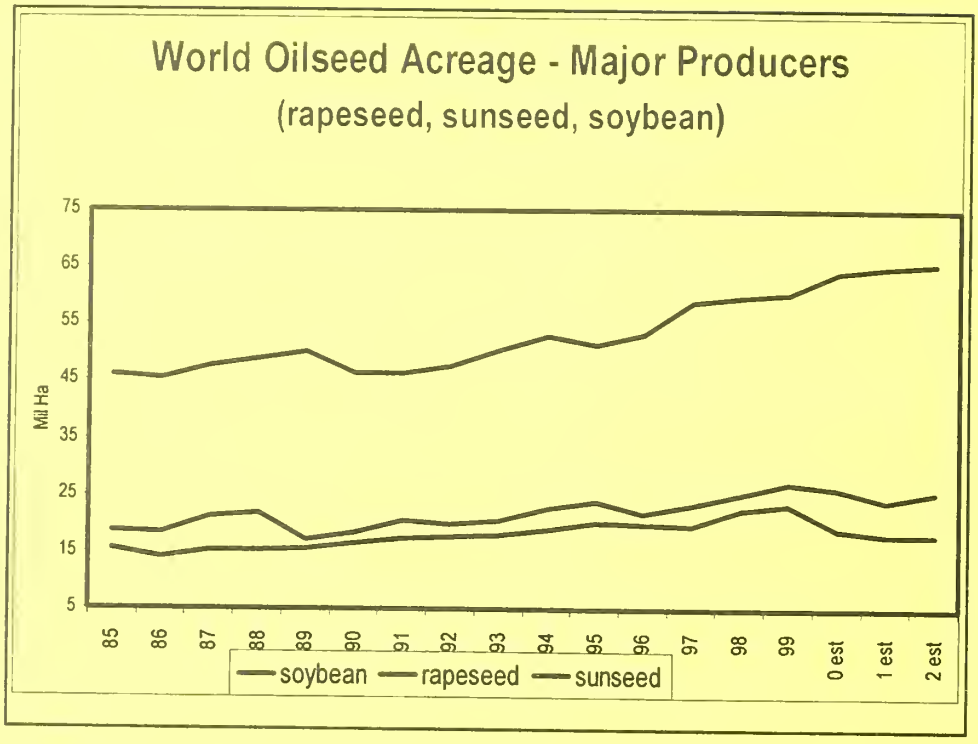


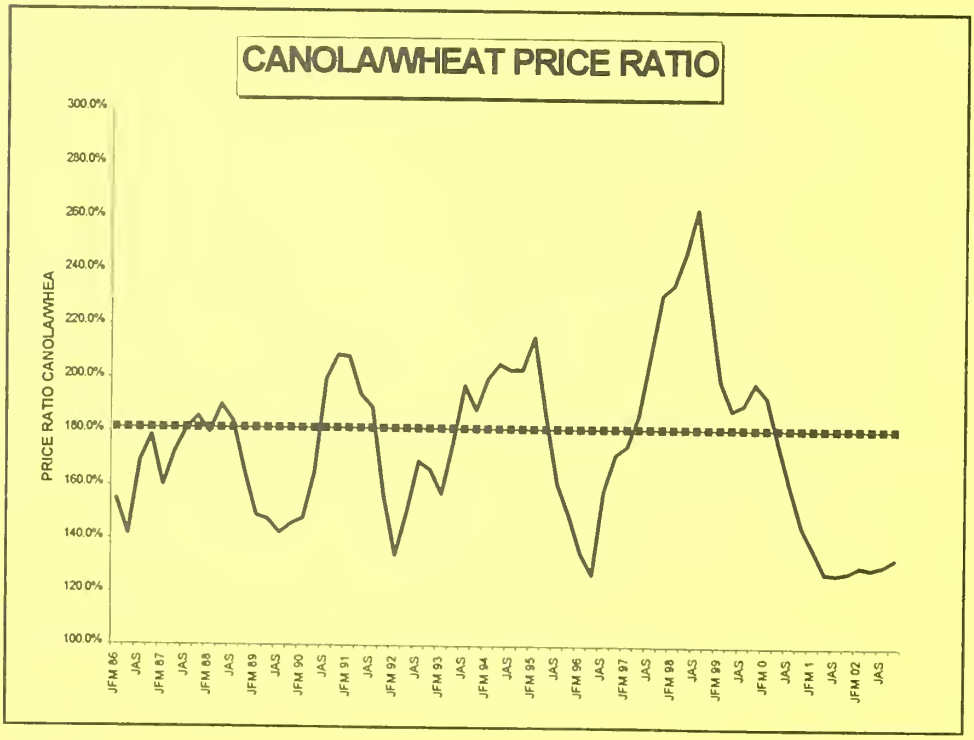
Acreage ...

- Soybean acreage increasing - freedom to farm with high support price of beans relative to corn resulting in a movement to almost 50/50 rotation in U.S. corn belt
- Good soybean growing weather in Argentina resulting in very favorable production returns

Acreage ...

- Shift from high oil bearing seed acreage (rapeseed and sunseed) to wheat and barley in EEC, Canada, Australia, and Argentina
- High oil prices of 1998 led to huge expansion in softseed acreage which led to oversupply of oils driving prices to current lows which is pushing acreage into other more profitable crops


World Oilseed Acreage - Major Producers
(rapeseed, sunseed, soybean)
Mil Ha
75
65
55
45
35
25
15
5
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
0 est
1 est
2 est
soybean
rapeseed
sunseed


CANOLA/WHEAT PRICE RATIO
PRICE RATIO CANOLA/WHEA
300.0%
280.0%
260.0%
240.0%
220.0%
200.0%
180.0%
160.0%
140.0%
120.0%
100.0%
JFM 86
JAS
JFM 87
JAS
JFM 88
JAS
JFM 89
JAS
JFM 90
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JFM 91
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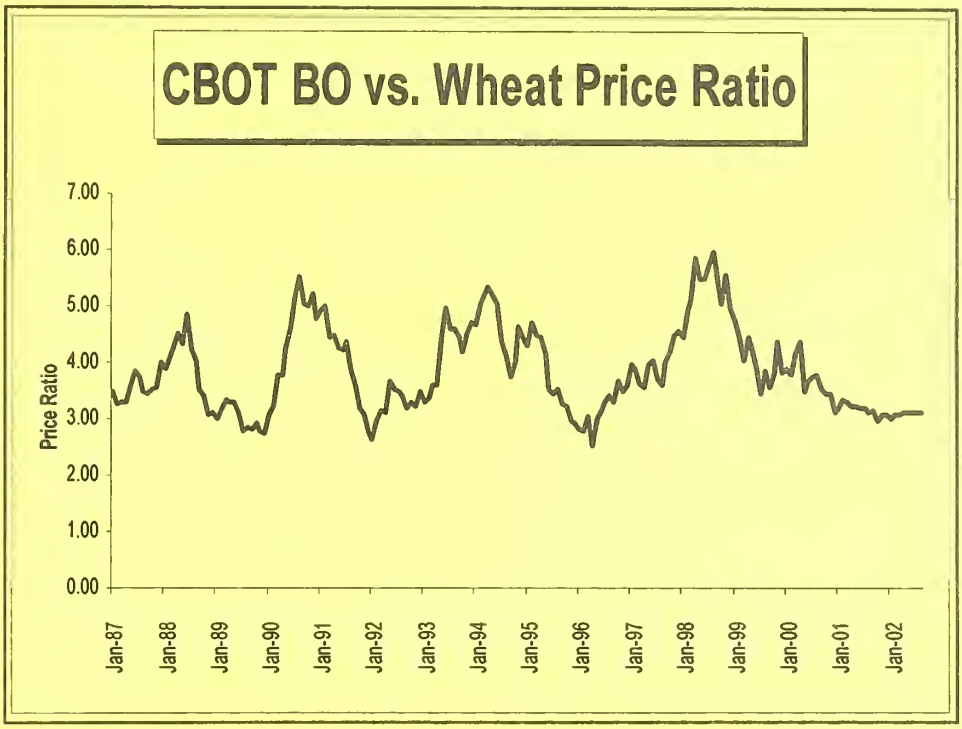
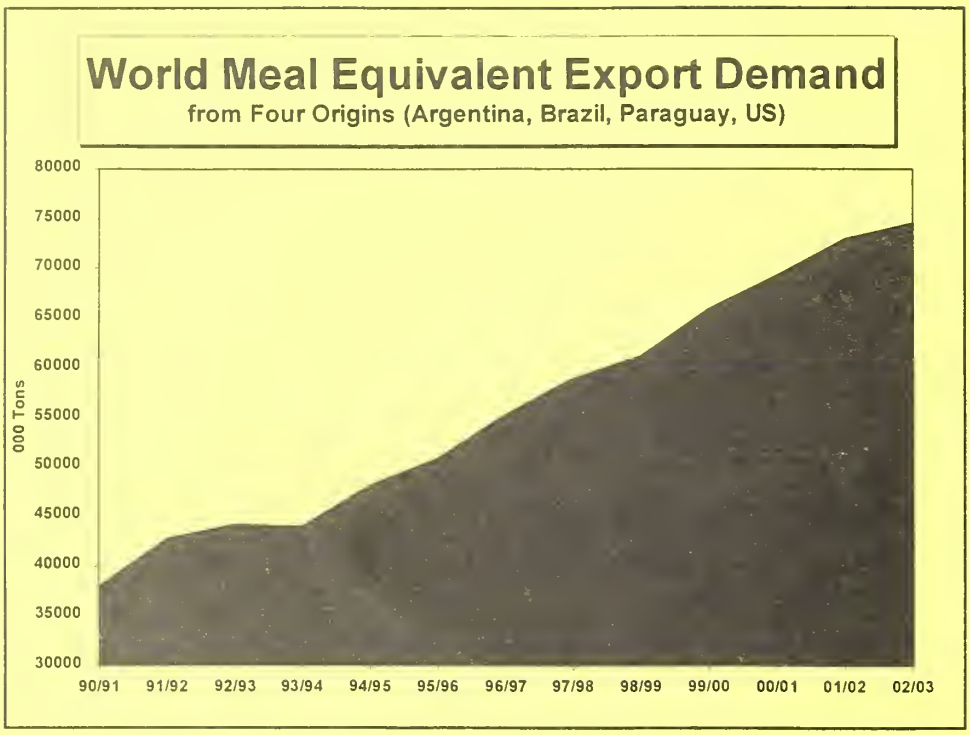
JAS



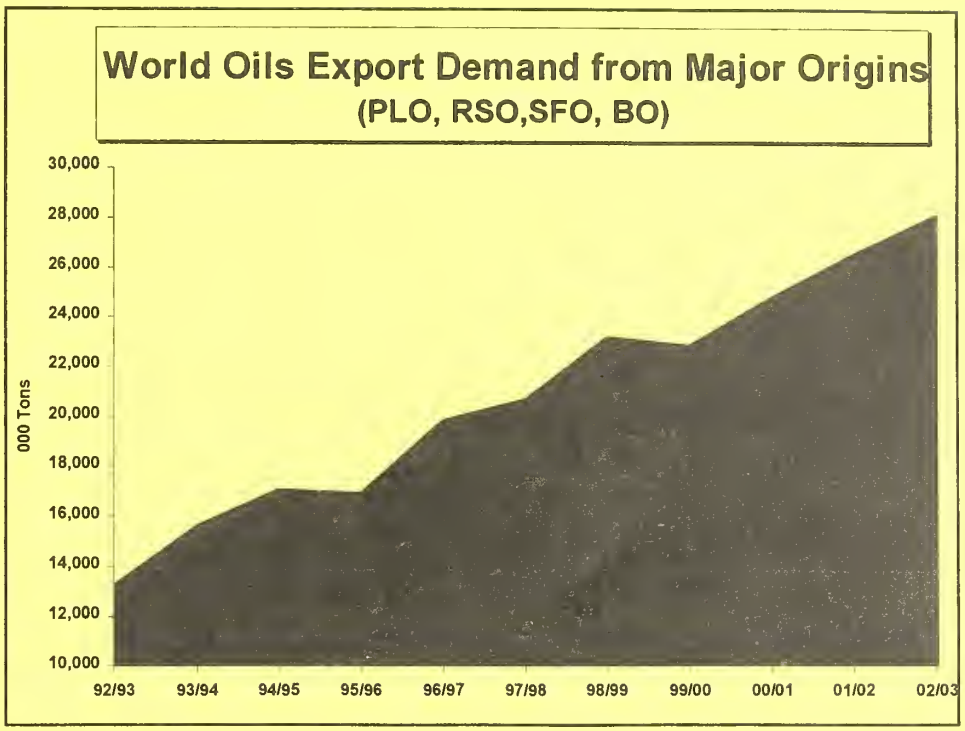
Expanding Demand for Meal and Oils

- World meal equivalent trade from the three origins of U.S., Brazil and Argentina continues to expand - greatly helped by the recent MBM ban in EEC
- Growth averaging 7% per year over the last five year



World Oil Demand

- Expanding also at rapid pace
- India demand growing at 7%



Soybean Balance Sheet

- Despite large demand growth, production has kept up with demand
- With excellent potential of South American crops, we will see an expansion of three origin stocks.
- If U.S. planting weather is good soybean prices should stay under pressure to assure continued demand growth

Soybean Balance Sheet
(Argentina, Brazil, USA)

SEP-AUG	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
CI	17,741	24,662	18,447	13,456	24,345	27,671	25,959	30,166	32,380
PRODUCTION	107,292	95,613	102,353	124,938	125,149	125,704	136,388	139,171	139,665
IMPORTS	784	1,000	2,444	672	1,057	1,169	1,225	1,110	1,170
TOTAL SUPPLY	108,076	96,613	104,797	125,610	126,206	126,873	137,613	140,281	140,835
CRUSH	67,062	69,001	70,491	74,653	81,058	79,883	82,097	85,321	87,857
EXPORT	29,376	27,851	32,985	35,846	35,084	42,281	44,495	45,750	45,962
SFR	4,717	5,975	6,312	4,222	6,738	6,421	6,814	6,996	7,000
TOTAL DEMAN	101,155	102,827	109,788	114,721	122,880	128,585	133,406	138,067	140,819
CO	24,662	18,447	13,456	24,345	27,671	25,959	30,166	32,380	32,396
CO/USE	24%	18%	12%	21%	23%	20%	23%	23%	23%

Rapeseed Balance Sheet

- Continued large acreage shifts out of rapeseed
- Leading to very tight B/S for 01/02

Rapeseed Balance Sheet
(Australia, EEC, Canada)

JULY/JUNE	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
CI	1001	1283	1925	1396	1210	1683	3300	2479	1426
PRODUCTION	14476	15069	12906	15972	18909	22690	17874	16628	16339
IMPORT	1360	969	538	465	997	968	1181	809	810
TOTAL SUPPLY	16838	17321	15368	17834	21116	25341	22355	19916	18575
CRUSH	9910	10829	9464	11513	12032	12700	12096	12000	11658
EXPORT	4253	3298	3272	3841	6120	7730	6186	4950	4195
SFR	1391	1269	1227	1268	1291	1611	1594	1540	1430
TOTAL DEMAN	15554	15396	13964	16622	19443	22041	19876	18490	17283
CO	1283	1925	1404	1212	1674	3300	2479	1426	1292
CO/USE	8%	13%	10%	7%	9%	15%	12%	8%	7%

Sunseed Balance Sheet

- Large loss of acreage in Argentina because of low prices
- Expected decreases in the Black Sea growing areas
- Will lead to a rationing situation for this and next season
- Crush will be rationed by 2 mil T this year and another 1.5 mil T in '01/02

Sunseed Balance Sheet
(Argentina, Black Sea, EEC)

AUG/JULY	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
CI	1875	2562	3367	3293	2766	3440	3495	1569	1546
PRODUCTION	16871	19295	17595	17421	19087	18542	14673	15066	15479
IMPORT	2040	2817	2976	2586	3188	2647	1355	1351	1358
TOTAL SUPPLY	20785	24674	23937	23300	25041	24629	19522	17986	18383
CRUSH	15049	16754	16547	16638	17037	17215	15411	13960	14370
EXPORT	1918	2970	2661	2485	3074	2359	1314	1271	1273
SFR	1256	1583	1435	1410	1490	1559	1228	1209	1209
TOTAL DEMAN	18223	21307	20644	20534	21601	21134	17953	16440	16852
CO	2562	3367	3293	2766	3440	3495	1569	1546	1531
CO/USE	14%	16%	16%	13%	16%	17%	9%	9%	9%

In general

- Without a major weather disruption or rapid price change, we will continue to see
  - a build up in soybean stocks and
  - a lowering of softseed carryouts

What This Means for the Oilseed Markets

- Soybeans will stay under pressure until we see a shift in acreage expansion or a weather problem
- The real story will be in vegetable oils

Vegetable Oils

- Palm production has spiked because of acreage expansion triggered by high oil prices of the late 90's and good growing conditions
- Since 1997 Palm production is up more than 4 mil tons
- This has helped to keep oil prices under pressure

Palm Oil Balance Sheet

(Malaysia, Indonesia)

OCT-SEP	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
CI	962	1,092	1,524	1,598	1,305	1,653	1,904	1,913	2,294
PROD	11,807	12,839	14,077	13,560	15,704	17,476	18,937	20,119	21,067
IMPORT	100	57	163	88	151	100	122	180	120
TOTAL SUPPLY	11,907	12,896	14,240	13,648	15,855	17,576	19,059	20,299	21,187
DOMESTIC	3,141	3,484	3,951	3,727	3,807	4,438	4,578	4,905	5,275
EXPORT	8,636	8,979	10,216	10,214	11,700	12,886	14,472	15,013	15,840
TOTAL DEMAN	11,777	12,463	14,166	13,942	15,507	17,325	19,050	19,918	21,115
CO	1,092	1,524	1,598	1,305	1,653	1,904	1,913	2,294	2,366
CO/USE	9%	12%	11%	9%	11%	11%	10%	12%	11%

Palm Oil ...

- Current low oil prices will result in
  - a slowdown in acreage expansion
  - and a reduction in input use

Sunoil ...

- Sunoil will need to be rationed for the next two years and will be the premium oil
- We will need to lose 500 kmt of demand for this year and another 1 mmt for next year

Sunoil Balance Sheet
(EEC, Argentina, US)

OCT-SEP	1994/95	1995/96	1996/97	1997/98	1998/99	1999/20	2000/01	2001/02	2002/03
CI	326	257	541	456	424	451	596	(47)	(1,387)
CRUSH	11,035	11,064	12,152	11,734	12,362	11,211	9,447	8,587	8,992
OIL PROD	4,482	4,493	4,970	4,737	5,025	4,628	3,846	3,483	3,639
IMPORT	212	125	111	189	214	184	179	61	61
TOTAL SUPPLY	4,694	4,618	5,081	4,926	5,239	4,812	4,025	3,544	3,700
DOMESTIC	2,619	2,530	2,767	2,740	2,813	2,781	2,787	2,801	2,824
EXPORT	2,144	1,804	2,400	2,217	2,399	1,885	1,880	2,084	2,139
TOTAL DEMAN	4,763	4,334	5,167	4,957	5,212	4,667	4,667	4,885	4,963
CO	257	541	456	424	451	596	(47)	(1,387)	(2,650)
CO/USE	5%	12%	9%	9%	9%	13%	-1%	-28%	-53%

Rapeseed Oil ...

- Rapeoil will also be in a rationing mode next season as lower crush will require 500 kmt of demand to be pushed to another oil
- Continued strong EEC demand for biodiesel and non-gmo products will make it difficult to ration
- The Chinese will enter WTO in January 2002 importing larger quantities of rape and bean oil. They will import minimal quantities of rapeseed

Rapeseed Oil Balance Sheet
(Canada, EEC)

OCT-SEP	1994/95	1995/96	1996/97	1997/98	1998/99	1999/200	2000/01	2001/02	2002/2003
CI	286	391	327	338	437	447	493	559	(167)
CRUSH	9,858	10,460	9,834	11,654	11,500	12,139	12,079	11,590	11,018
OIL PROD	4,074	4,333	4,059	4,783	4,720	5,000	4,959	4,757	4,519
IMPORT	25	41	77	73	18	89	105	90	85
TOTAL SUPPLY	4,099	4,373	4,136	4,856	4,738	5,088	5,064	4,847	4,604
DOMESTIC	2,521	3,105	2,787	3,032	3,239	3,615	3,844	4,112	4,337
EXPORT	1,473	1,333	1,338	1,725	1,489	1,427	1,154	1,461	1,573
TOTAL DEMAND	3,994	4,437	4,125	4,757	4,728	5,042	4,998	5,573	5,910
CO	391	327	338	437	447	493	559	(167)	(1,473)
CO/USE	10%	7%	8%	9%	9%	10%	11%	-3%	-25%

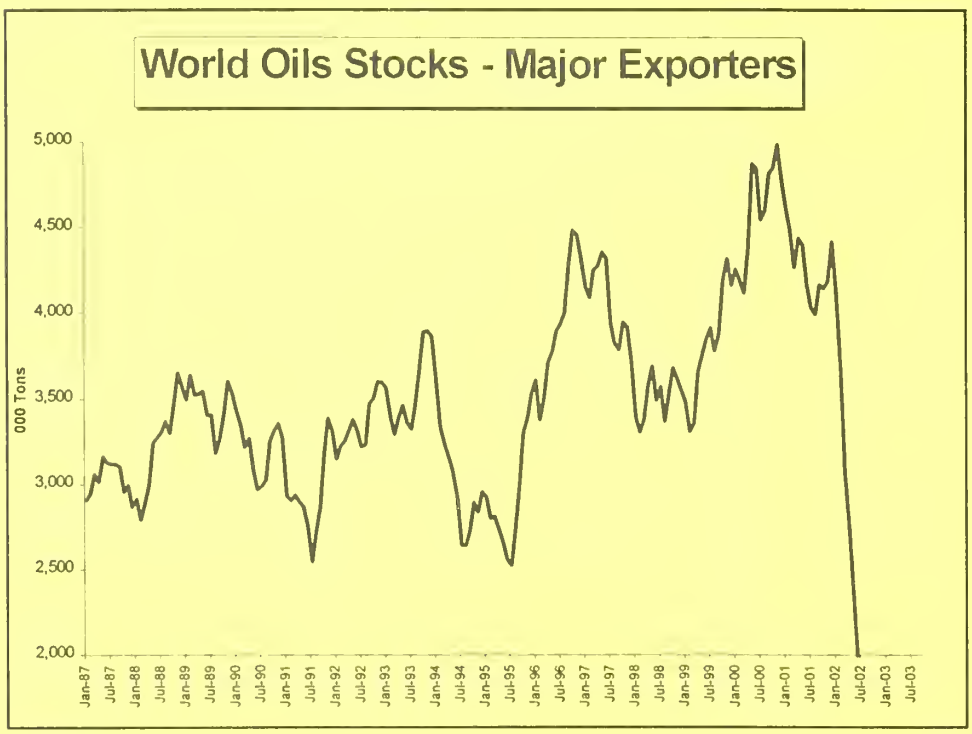
Soybean Oil

- China WTO entry in January 2002 will result in an increase of soybean oil demand

Soybean Oil Balance Sheet
(Argentina, Brazil, EEC, US)

OCT-SEP	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03
CI	1,152	1,244	1,903	1,397	1,368	1,330	1,824	1,742	1,169
CRUSH	82,283	82,695	85,462	91,807	97,136	94,785	98,630	101,682	103,591
OIL PROD	15,056	15,190	15,431	16,896	17,943	17,579	18,235	18,749	19,102
IMPORT	268	237	196	237	221	141	142	168	229
TOTAL SUPPLY	15,324	15,427	15,628	17,133	18,164	17,720	18,377	18,917	19,331
DOMESTIC	10,380	10,707	11,125	11,416	11,528	11,677	12,088	12,422	12,666
EXPORT	4,851	4,062	5,009	5,746	6,674	5,548	6,371	7,069	7,754
TOTAL DEMAND	15,231	14,769	16,134	17,163	18,202	17,225	18,459	19,491	20,420
CO	1,244	1,903	1,397	1,368	1,330	1,824	1,742	1,169	79
CO/USE	8.2%	12.9%	8.7%	8.0%	7.3%	10.6%	9.4%	6.0%	0.4%

- All oil B/S will begin to tighten this summer and by March of 2002 we will hit record low vegetable oil stocks
- In the first quarter of 2002 prices of vegetable oil will need to react sharply to buy acreage back to softseeds



World Oils Balance Sheet

(Rape, Sun, Palm and Soybean)

OCT-SEP	1994/95	1995/96	1996/97	1997/98	1998/99	1999/2000	2000/01	2001/02	2002/2003
CI	2,725	2,984	4,295	3,789	3,534	3,881	4,817	4,168	1,909
CRUSH	103,176	104,219	107,447	115,195	120,998	118,135	120,157	121,859	123,601
OIL PROD	35,418	36,855	38,538	39,976	43,392	44,682	45,977	47,108	48,326
IMPORT	605	460	548	588	604	513	548	499	495
TOTAL SUPP	36,024	37,315	39,085	40,563	43,996	45,196	46,525	47,607	48,822
DOMESTIC	18,662	19,826	20,630	20,916	21,387	22,512	23,297	24,240	25,102
EXPORT	17,103	16,177	18,962	19,903	22,262	21,747	23,877	25,627	27,306
TOTAL DEMA	35,765	36,003	39,592	40,818	43,649	44,259	47,174	49,867	52,408
CO	2,984	4,295	3,789	3,534	3,881	4,817	4,168	1,909	(1,678)
CO/USE	8%	12%	10%	9%	9%	11%	9%	4%	-3%

Summary

- With large soybean supplies and tight vegetable oil situation, the oil portion of the soybean value will need to see a sharp correction

NEW DEVELOPMENTS IN DAIRY FOR 2001

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I want to briefly review a few major developments that are affecting the U.S. dairy industry this year, which should be kept in mind when discussing the dairy outlook. My comments will consist of observations on where the industry stands in its recovery from the present cycle of expansion-induced low prices, coupled with some remarks on some key dairy policy issues.

Regaining Supply-Demand Balance

The dairy industry is in the process of recovering from the largest buildup of the nation's milking herd since the expansion of the late 1970's and early 1980's. At its peak last summer, USDA/NASS reported 100,000 more milk cows than a year earlier. By contrast, during the period between 1988 and 1998, when milk prices were sustained at reasonable levels by market forces, national cow numbers dropped by an average of more than one hundred thousand head each year in order to maintain that supply-demand balance. Recent NASS data show cow numbers are starting to converge with the previous year, and we should expect the milking head to start shrinking again, on an annual basis, sometime this year. Market prices are beginning to come off their year 2000 lows in response.

From the long-term outlook perspective, an interesting question relates to the convergence point where the industry can sustain a balance between supply and demand as it did in the mid-1990's. At that time, it became a rule of thumb that the industry needed to shed at least one percent of the milking herd to stay in balance. That level of herd contraction was needed to counterbalance strong growth in production per cow with somewhat slower-growing commercial demand.

Recent trends in dairy product consumption, however, may be altering this equation. In particular, exceptionally strong growth in demand for cheese and butterfat in all forms in the domestic market, and for whey in the domestic and export markets, may make it possible in the next few years to sustain prices without requiring as large a reduction in cow numbers. If this is the case, and if the current economic downturn does not impact dairy product demand too much, then we could have a quicker, and hopefully sustainable, recovery in dairy than our traditional rules of thumb may indicate. Despite some current market optimism, I think we will have to wait until the second half of this year before we can expect a clear answer to this question.

Policy Issues that Affect the Dairy Outlook

Policy issues are never far away whenever the dairy market situation is the topic of conversation. This is not the place for a policy discussion, but I want to draw attention to a few

issues that are specifically relevant to the dairy outlook and which involve the major dairy policy mechanisms of price support, market orders and import access.

First and foremost, of course, is the fact that the dairy price support program of some fifty years' standing has lost its permanent legislative basis, and has been extended annually for the past two years. This clearly creates some long-term market uncertainty and has required the termination of the program to be explicitly modeled in the various policy baselines from USDA, CBO, FAPRI and others. What will actually happen if and when the program would terminate probably won't really be known until such time as it would occur.

A more immediate issue concerns the price support butter-powder "tilt." Recent changes in federal milk marketing order class pricing formulas, coupled with strong butterfat markets and surplus supplies of nonfat milk solids in the domestic market have somewhat unexpectedly put the price support program back in the business of directly supporting milk prices and dairy producer income, for the first time since the mid-1980's. Prices paid to producers for roughly sixty percent of their milk directly depend, at this time, on the CCC purchase price for nonfat dry milk. This makes the matter of adjusting the butter-powder tilt a bigger issue than it was in the early 1990's, when the CCC purchase price for butter was cut in half, from $1.32 per pound to $0.65 per pound over a period of just four years. A key component of the dairy outlook therefore is a USDA administrative action.

Discussion of a butter-powder tilt is clearly being driven by the large quantities of nonfat dry milk currently purchased under the price support program. This surplus of nonfat milk solids, coupled with tight butterfat markets, gives a strong impression that the domestic industry is exhibiting a structural surplus of the former, much as it exhibited a structural surplus of butterfat a decade ago. However, if the growing level of milk protein imports in the non-TRQ categories of milk protein concentrate and casein are taken into consideration, a case can be made that the current nonfat dry milk surplus that is burdening the program is not so much due to a structural surplus of domestic milk production as it is due to an import displacement situation.

With regard to federal milk marketing orders, the current order pricing formulas have been in effect for a little over a year, and we are already seeing some of their effects on the industry. From the perspective of the dairy outlook, one of the key changes has been a lessening of the influence of cheese prices on the entire federal order milk pricing structure than under the previous Basic Formula Price-driven system. In particular, the current Class I price mover has made it more important to be able to forecast, and to understand the forces driving, the relative returns to milk used to produce cheese and milk used to produce butter and milk powder, as are now measured by federal order Class III and Class IV prices.

ENVIRONMENTALLY SUPERIOR WASTE MANAGEMENT TECHNOLOGIES

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Introduction: Discussions and efforts regarding animal waste management practices and the impact of animal agriculture on the environment are at the forefront of issues facing the livestock industry, pork production in particular. In North Carolina, much attention directed at pork production is primarily on "alternatives" to the lagoon/spray field technology. Soil and water quality issues associated with this technology have been identified to be: nutrient loading and fate of nitrogen, phosphorus, and metals (copper and zinc); and, fate of pathogenic bacteria in the manure effluent and air emissions from animal production facilities. Air quality issues identified include emissions of ammonia nitrogen, greenhouse gases, dust and odor. A recent discussion article (North Carolina State University College of Agriculture and Life Sciences, 2000) notes that when properly sited, designed, constructed and managed, lagoon/spray field technology is a reliable method of treating swine wastes; however, evidence in this same article also shows that environmental concerns for the soil, water, and air quality variables noted above need to be critically and objectively examined.

The attention directed to this subject area has resulted in research, development and demonstration efforts by academic institutions, the private sector, as well as the livestock industry. Primary focus has been on various alternatives or modifications to traditional best management practices of animal waste management. A recent report (North Carolina Department of Environment and Natural Resources, 2000), compiled after several months of deliberations by a stakeholder panel, shows that such broad-based efforts are underway not only in North Carolina, but nationally and internationally as well.

On July, 25, 2000 an Agreement was made between the Attorney General of North Carolina and Smithfield Foods, Inc. and its subsidiaries to, in part, provide resources ($15 million) to North Carolina State University (NCSU) for the development of "Environmentally Superior Technologies" that may serve as alternatives to traditional lagoon/spray field technology. This paper provides a concise overview and discussion for some salient aspects of this research initiative.

Definition of Environmentally Superior Technologies: The Agreement defines "Environmentally Superior Technologies" as "any technology, or combination of technology that (1) is permittable by the appropriate governmental authority; (2) is determined to be technically, operationally, and economically feasible for an identified category or categories of farms and (3) meets the following performance standards:

1. Eliminate the discharge of animal waste to surface waters and groundwater through direct discharge, seepage, or runoff;

2. Substantially eliminate atmospheric emissions of ammonia;

3. Substantially eliminate the emission of odor that is detectable beyond the boundaries of the parcel or tract of land on which the swine farm is located;

4. Substantially eliminate the release of disease-transmitting vectors and airborne pathogens; and

5. Substantially eliminate nutrient and heavy metal contamination of soil and groundwater."

It is noteworthy that items 1. -5. are verbatim from one section of North Carolina House Bill 1480 intended, in part, to "clarify exceptions to the statewide moratorium" relative to the construction or expansion of swine farms. As such, it is logical to assume that technologies determined to be "environmentally superior" per this Agreement, may also be considered for installation on facilities wishing to expand swine production in North Carolina.

These definitions (items 1.-5.), while comprehensive, are open to broad interpretation and present numerous challenges. The most challenging task may well be the interpretation of "substantially eliminate". No two stakeholders impacted by pork production are likely to have the same definition of "substantially eliminate" for each of the environmental variables referenced. The final determination, however, of what "substantially eliminate" means quantitatively is likely to be made by the North Carolina Department of Environment and Natural Resources (NCDENR) since the technology, by Agreement definition, must also be "permittable".

A second concern is valid measurement for some of the environmental variables noted. Performance verification (and any subsequent monitoring for compliance purposes) of odor emissions, ammonia emissions, and disease-transmitting vectors and airborne pathogens present unique challenges. There is currently much scientific debate regarding protocols and methodology for making these measurements. Further, the methodologies utilized for each can be expensive and often represent single-point-in-time determinations. This is an issue for air emissions in particular since it is well established that such emissions can be highly variable within a given day dependent upon many environmental conditions (wind, humidity, temperature, precipitation, etc.) at a farm site.

While these issues are indeed challenging, it is recognized that they must be addressed. To help meet these challenges, it will be critically important for the pork industry, university researchers, NCDENR, and other impacted stakeholders to maintain close communication and engage in professional scientific debate on this subject as new technologies and verification methods are developed, evaluated and demonstrated. As such, the NCSU initiative with this Agreement involves an advisory review panel that is represented by: experienced researchers in the areas of animal waste management and environmental science and public health; NCDENR; environmental and community interest; business management; and, swine agribusiness.

Operational feasibility: There is little debate that one advantage of the lagoon/spray field system is operational simplicity. "Environmentally Superior Technologies" are likely to be more operationally complex and require additional operator skill, training and certification. Operational feasibility may also be interpreted differently for various "category or categories of farms" (described in subsequent section of this paper). The Agreement does not contain a definition of operational feasibility, nor does it contain a listing of factors for consideration in making the determination (as it does for economic feasibility). The history of operational requirements during the performance verification process will be well documented for all technologies studied during this initiative and considered on a case by case basis for operational feasibility prior to making a technology determination for "environmentally superior" status. Factors considered will include technical skill (training and certification) and hours/day required operating and maintaining the technology, technology performance during adverse weather conditions (including but not limited to periods of power outage, excess rainfall, freezing temperatures, etc.).

Economic feasibility: The Agreement is very specific regarding the determination of economic feasibility. The following relevant information must be considered:

1. "The projected 10-year annualized cost (including capital, operation and maintenance costs) of each alternative technology expressed as a cost per 1000 pounds of steady state live weight for each category of farm system;

2. The projected 10-year annualized cost (including capital, operation and maintenance costs) per 1000 pounds of steady state live weight for each category of farm system of a lagoon and sprayfield system that is designed, constructed and operated in accordance with current laws, regulations, and standards, including NRCS design, construction and waste utilization standards;

3. Projected revenues, including income from waste treatment byproduct utilization, together with any costs savings from the new technology;

4. Available cost-share monies or other financial or technical assistance from federal, state or other public sources, including tax incentives or credits, and;

5. The impact that the adoption of alternative technologies may have on the competitiveness of the North Carolina pork industry as compared to the pork industry in other states."

These are important economic variables and will require considerable effort to determine. The Agreement specifies that an advisory review panel, separate from the panel described earlier, will be involved in evaluating the economic feasibility of the potential alternative technologies. Representation on this panel must include experts in economics from: academia; environmental interest; government; and, the swine industry.

Category or categories of farms: Category(ies) of farm(s) is referenced several times throughout the Agreement. The Agreement specifies that such categories "may be determined based on farm size, geographic location, the geographic concentration of the hog population, the type of farm, and any other factors" deemed appropriate. This is an important determination since some of these variables may significantly impact the economic feasibility of a technology for a given farm category. The Agreement also specifies that all farms covered by the Agreement must be prioritized for conversion to "Environmentally Superior Technologies" based "on appropriate environmental, engineering and operational factors".

Progress to date and discussion: The following describes activities that have occurred since July 25, 2000 relative to the NCSU research initiative of the Agreement and discussion regarding the next 18 months of the initiative.

Both advisory review panels have been appointed. A total of 21 members make up both panels (the economic panel is made up of 5 individuals).

The initial 5 technologies for "installation beginning immediately" per the Agreement have been selected. Those selections were based primarily on work previously conducted through NSCU CALS programs for each of the technologies (Williams, 2000). The technology teams for these 5 systems have made presentations and provided documents to the advisory review panels as well as responded to questions and concerns voiced by these panels. A general description for these technologies are: 1) a covered in-ground ambient anaerobic digester; 2) an upflow biofiltration system; 3) a sequencing batch reactor process; 4) constructed wetlands treatment; and 5) high temperature anaerobic digestion. Systems 1 and 4 are installed on commercial swine farms in North Carolina in Johnston and Onslow counties, respectively. Tentative sites have been identified for each of the 3 additional technologies. Plans are for all 5 to be operational by summer 2001.

The Agreement specifies that an additional 5-6 technologies will be selected for performance verification by early 2001. In response to a request for proposals issued by NCSU in September 2000, approximately 100 technology suppliers applied for consideration. Over 30 professionals from have competitively reviewed those proposals across the U.S. It is anticipated that, based on those reviews, and review and recommendation by the advisory review panels, that an additional 5-6 (perhaps more, depending upon budgetary restraints) will be selected by early 2001. Again, it is planned

that these systems will be operational on farms and ready for performance verification by summer 2001.

These projected deadlines are aggressive. The Agreement, however, specifies that a report is due by July 25, 2002 which contains "(1) a finding that a technology or combination of technologies is an Environmentally Superior Technology or Technologies; (2) an identification of the category or categories of farms covered by the determination; (3) a determination (made in consultation with DENR) that the technology or technologies are capable of being permitted by DENR and any other appropriate governmental authority; and (4) a schedule for implementation of the Environmentally Superior Technology or Technologies as soon as possible". It is essential for everyone that is involved and/or impacted by this initiative, including pork producers, the animal agriculture industry, environmental groups, neighbors to animal operations, regulatory agencies, elected officials, university researchers, technology suppliers, etc., to recognize that many complex tasks must be accomplished prior to issuing this report. As described in this paper, these tasks will involve not only development and verification of new waste treatment technologies but also development and verification of new environmental parameter measurement methodologies as well. Consideration and review of potential technologies must be comprehensive and well justified such that resources (human and financial) are not wasted. The tasks will involve major construction projects with necessary permit procurement. And finally, the performance verifications must be subjected to valid scientific methodology including replication of data under stringent conditions of quality assurance and quality control. While every effort will be made to meet the deliverables described in the Agreement to identify "Environmentally Superior Technologies", the stakes are too high for everyone that is involved and/or impacted by this initiative for short cuts to be taken or premature decisions to be made relative to any of these described tasks.

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COMPREHENSIVE NUTRIENT MANAGEMENT PLANS: POLICY AND PROSPECTS

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INTRODUCTION

Improving our soil and cleaning our surface and ground water resources through voluntary action has been a long standing and successful public/private partnership effort since the establishment of the USDA Soil Conservation Service (SCS) in 1935, and initiation of the public sharing of the costs of on-farm conservation with passage of the Soil Conservation and Domestic Allotment Act in 1936, and the Land Utilization Program in 1937. A basic tenant of NRCS, as expressed in 1945 to a congressional committee by Hugh Hammond Bennett (first SCS Chief), was and still is: "The only way in which water pollution due to erosion silt can be effectively controlled is by the adoption of soil and water conservation practices applied in accordance with the needs and capabilities of the land."

As continued research and field experience during the past half century have led to greater knowledge about what happens to water – how it travels on the surface and below ground, what it carries with it, and how its composition changes as it moves – water quality has emerged as a top priority for NRCS conservation efforts. Over the years, NRCS and its cooperating scientists have worked diligently to find the best conservation solutions and bring them to those who farm the land and manage the resources.

While much has been accomplished by farmers and ranchers in addressing nonpoint source pollution from agricultural lands and woodlands, there is still more that must be done. But why is there still more that must be done, despite the past and present conservation efforts of agriculture? Because conditions change - - working with livestock, poultry, natural resources, and agricultural economics by definition means that things will be ever changing - - and correspondingly that agricultural management and conservation practices must be ever evolving to respond to this change. Working with the land, livestock, and poultry means making changes to respond to the changes of nature, the changes in economic conditions, and the changes in knowledge and technology.

To accomplish the necessary next steps in cleaning our Nation's waters, farmers, ranchers, and forest landowners, as well as urban and suburban residents, will need to make an even greater and more focused effort to control nonpoint sources of pollution. Helping private landowners to reduce the sediment and nutrients, along with other pollutants, that may originate on working agricultural lands and woodlands is a primary goal of NRCS.

SIGNIFICANCE OF ANIMAL AGRICULTURE

NRCS recognizes the important economic, environmental, and social issues centered on animal agriculture in the United States, and in other countries, too. The beef, dairy, pork, and poultry industries face significant challenges and we must all work together to achieve viable solutions that make both environmental and economic sense.

Livestock and poultry production generated $93 billion in revenues in 1996 (USDA-NASS, 1997), making it an important part of both our Nation's economy and its food supply. America's food supply is the envy of the world. But our Nation's farmers and ranchers produce far more than traditional commodities. Well managed agricultural operations also produce healthy soil, clean air and water, wildlife habitat, and pleasing landscapes, all of which are increasingly valued by rural and urban citizens alike.

ENVIRONMENTAL IMPACTS OF ANIMAL AGRICULTURE

However, along with the many benefits that animal agriculture provides, it also produces huge amounts of by-products, such as manure, litter, and waste water. Animal agriculture impacts a significant amount of land in many watersheds because animal manures are applied in solid, semisolid, and liquid forms, as a source of nutrients for crop production. Animal agriculture has garnered much notoriety because of problems associated with improper facilities management and land application of manures at excessive rates. Public criticism has been triggered by outbreaks like *Pfiesteria* in the Chesapeake Bay area, *hypoxia* in the Gulf of Mexico, large lagoon spills, and offensive odors from some animal feeding operations.

Two issues of particular concern to NRCS include pollution of waters from improperly managed animal feeding operations, and the inadequacy of traditional land-based manure nutrient management strategies in some geographic areas as livestock and poultry operations surpass the capacity of the land to assimilate manure nutrients.

NRCS' VOLUNTARY, LOCALLY LED APPROACH

NRCS is working with other Federal agencies, tribal, State, and local public entities, along with the private sector, to help the owners and operators of animal feeding operations (AFO) to voluntarily address the environmental challenges they face. We are supporting the science-based, site-specific solutions that work well for the unique needs of the livestock and poultry sector, and recognize the financial constraints that animal producers face.

NRCS is a strong proponent of the voluntary, incentive-based approach as the principal means to help agricultural producers reduce the environmental impacts of agricultural production. We recognize, however, that regulations administered by regulatory agencies play an important role for the very large, high risk, confined animal feeding operations and for some other very specific situations.

NRCS' conservation programs work in partnership with locally led processes and other local, State, tribal, Federal, and private entities to deliver support for individual, group, and community efforts through research and technology transfer, information, education, technical and financial assistance, and innovative pilot and policy approaches. For example, NRCS' Conservation Technical Assistance and Environmental Quality Incentives Programs are two principal vehicles used by the agency to assist animal feeding operations in meeting environmental objectives in a voluntary manner, while maintaining production. It is also important to note that NRCS' conservation programs are used by many agricultural producers as the technical and financial assistance tools to help them comply with local, State, tribal, and Federal regulations.

COMPREHENSIVE NUTRIENT MANAGEMENT PLANNING TECHNICAL GUIDANCE

Specially toward achieving the goal of helping animal feeding operation owners and operators to manage their operations in a profitable and environmentally sound manner, NRCS in recent years has identified the environmental needs of animal feeding operations as a top conservation priority - - by focusing the energy and identifying the resources needed to carry out:

- Effective information and education of AFO owners and operators,
- Research and technology transfer,
- Direct technical assistance, and
- Financial assistance.

Toward achieving the objective of getting the needed technical guidance in place to help public and private technical specialists assist AFO owners and operators with their development of CNMPs, NRCS released in December 2000 the Technical Guidance for Developing Comprehensive Nutrient Management Plans. This Technical Guidance was developed over the past year and included receiving constructive public input on the draft guidance through a 120-day public comment period.

The Technical Guidance provides a framework for helping animal feeding operation owners and operators to develop their site-specific, technically sound CNMPs. NRCS' technical handbooks, policies, processes, and planning procedures will provide the up-to-date technical references to help fill in the framework.

A CNMP is a subset of a conservation plan that is unique to animal feeding operations. It is a grouping of conservation practices and management activities which, when combined into a system, will help to ensure that both agricultural production and natural resource conservation goals are achieved. The development of a CNMP needs to address the following six elements:

1. **Manure and Wastewater Handling and Storage** – This element addresses the components and activities associated with the production facility, feedlot, manure and wastewater storage

and treatment structures and areas, and any areas or mechanisms used to facilitate transfer of manure and wastewater.

2. **Land Treatment Practices** – This element addresses evaluation and implementation of appropriate conservation practices on sites proposed for land application of manure and wastewater from an AFO.

3. **Nutrient Management** – This element addresses the requirements for land application of all nutrients and organic by-products (e.g., animal manure, wastewater, commercial fertilizers, crop residues, legume credits, irrigation water, etc.) that must be evaluated and documented for each Conservation Management Unit (CMU).

4. **Record Keeping** – It is important that good records are kept to effectively document and demonstrate implementation activities associated with CNMPs. This element lists documentation requirements associated with developing and implementing a CNMP.

5. **Feed Management** – Feed management activities may be used to reduce the nutrient content of manure, resulting in less land being required to utilize the nutrient contents of the manure. This element addresses feed management activities as a possible opportunity for the AFO owner/operator in the CNMP development process.

6. **Other Utilization Activities** – This element addresses other environmentally-sound utilization options associated with animal manure and wastewater as alternatives to traditional operational and land application methods.

NRCS recognizes that the present CNMP Technical Guidance does not establish criteria to specifically address resource concerns other than the nutrient and sediment aspects of water quality. Many issues related to air quality, odors, pests, pathogens, pharmaceuticals, and heavy metals are not fully understood. We need to develop more agency conservation practice technical standards to more adequately address these issues or problems. It is envisioned that the CNMP Technical Guidance document will evolve over time to address all environmental and public health concerns associated with manure and by-products from animal feeding operations. However, most of the actions undertaken through the implementation of CNMPs under the current Technical Guidance should benefit all natural resource concerns - - soil, water, air, plants, animals, and humans.

Given the magnitude and complexity of the CNMP workload, there is no question that the public and private sectors will need to collaborate closely, using the NRCS' CNMP Technical Guidance and supporting technical references and tools, if we are to succeed in meeting the needs of AFO owners and operators.

In an effort to build additional technical assistance capacity for comprehensive nutrient management planning assistance in the private sector, NRCS is establishing a process for recognizing "approved sources" of conservation assistance. An individual who is appropriately certified through an NRCS recognized approved source is referred to as a "certified specialist". This may include private consultants, employees of agribusiness, and others who hold appropriate certifications through an approved independent certification organization or state licensing agency.

THE NEED FOR A GREATER MIX OR POLICY TOOLS, INCENTIVES, AND PARTNERSHIPS

The environmental and economic challenges faced by family operated animal feeding operation (AFOs) also calls out for a greater mix of policy instruments, innovative approaches, and alternative incentives. Some broad areas for consideration could include:

- **Economically Profitable Conservation Technologies** – On-farm conservation technologies should be both good for the environment and good for business. More research and technology transfer are needed to develop and share with both field staff and AFO owners/operators practical conservation technologies that yield short- and long-term economic benefits.

- **Public/Private Collaboration to Enhance Technical Assistance Capacity** – More and stronger public/private collaboration to supply AFO owners and operators with essential technical assistance for conservation technology adoption is needed. Depending on the need(s), this collaboration can take many different forms, but the key is to capitalize on the strengths of both the public and private sectors to achieve more effective and efficient technical assistance delivery.

- **Improved Economic Training and Tools for Field Staff** – Both public and private sector technical field staff need a better understanding and more intense training in the economics of conservation technologies, and how to apply it in the comprehensive nutrient management planning process. Along with this enhanced knowledge, field staff need user-friendly tools, including software, to more readily apply this knowledge.

- **Policies to Stimulate Conservation Technology Innovation** – The pressures of potential and real increasing regulation for AFO owners and operators may present an impetus for stimulating conservation technology innovation. While technological innovation is occurring in agriculture (crop residue management techniques, biotechnology, bioenergy, and precision farming), the opportunity for more and greater conservation technology advances in the animal residuals management arena seems realistic when one looks at the advances in medicine, information technology, communications, automation, and other areas.

- **New Risk Management Tools** – Some AFO owners and operators resist the adoption of new conservation technologies because they fear it may hurt their income. To address this risk, the private sector could make available more insurance policies that will increase an AFO owners' or operators' willingness to adopt conservation technologies, such as nutrient management, feed management, odor controls, or methane recovery technologies.

- **Expanded and Enhanced Partnerships** – A greater partnership effort between local, State, tribal and Federal agencies, farmers/ranchers, researchers, educators, private sector enterprises, interest groups, and communities is needed. Voluntary programs intended to help AFO owners and operators deploy on-farm conservation technologies while maintaining viable operations, are most successful when supported by strong partnerships.

- **Targeting Incentives** – Targeting incentives from local, State, tribal, Federal, and private sources in a more coordinated manner on vulnerable farming operations and/or at a geographic scale offers an opportunity to enhance the effectiveness of the limited incentives available. This may be especially true for certain types of farming operations, such as animal feeding operations, that tend to be more and more concentrated in certain geographic areas and if not properly managed can have significant environmental impacts.

- **Alternative Uses for Animal Residuals** – Alternative uses for animal residuals are needed in areas where supply exceeds available land, and land application would cause significant environmental risk. USDA and others in the research community must continue to actively pursue research that results in practical, cost-effective application of alternative uses for animal residuals such as: energy production; composting and pelletizing; mixing or blending with industrial or municipal by-products to produce value-added materials for specialized uses; and, using residuals as animal feed. This could help some localities better meet their energy and environmental needs if we had greater investments in alternative uses of animal residuals.

NRCS' ACTIONS TO HELP LIVESTOCK AND POULTRY PRODUCERS

In summary, NRCS' is focusing significant resources and energy to help livestock and poultry producers voluntarily balance production with environmental quality. More specifically, NRCS is:

- Working to ensure that flexible innovative, and credible technical tools and approaches are being prepared for CNMP development and implementation.

- Working to ensure that the knowledge, skills, and support are in place for NRCS and partner field staff to provide quality technical assistance.

- Working to enhance the financial tools available to assist with CNMP implementation.

- Working with the private sector to ensure that third-party vendors have access to training, technical information and tools, and certification processes.

- Developing a more integrated approach with partner USDA agencies for addressing AFO needs, especially with USDA's principal research agencies - - the Agricultural Research Service, the Cooperative State Research, Education and Extension Service, and the Economic Research Service.

- Working to build an outcome reporting capacity in order to quantify the economic, environmental, and other major benefits and effects from CNMP implementation.

The bottom line is that NRCS is using every tool available to us - - from research results to technical and financial assistance to education incentives - - to help livestock and poultry producers voluntarily meet environmental quality objectives.

FUTURE NRCS COMMITMENT TO WATER QUALITY

As we enter the 21st Century, I feel confident NRCS' legacy commitment to helping landowners and communities to voluntarily achieve water quality objectives will continue to be strong. Long-term strategies to help landowners and communities protect the quality of our Nation's waters will continue to be expressed by USDA's National Conservation Program, now being updated. Likely long-term strategies for USDA will include:

- Respecting and supporting States calling the shots when it comes to defining water uses, establishing water quality standards, and establishing priorities for action.
- Continuing to emphasize voluntary action by landowners and land users.
- Giving strong emphasis to water quality resource conservation needs in our technical assistance programs.
- Supporting research that helps landowners and landusers minimize the impact of their activities on water quality.
- Training employees to make sure that equipped to identify and help landowners and landusers solve water quality problems
- Providing financial and other incentives to farmers and ranchers for practicing good stewardship.

CONSERVATION SUCCESS THROUGH PARTNERSHIPS

In closing, NRCS conservation assistance is provided through local conservation districts and in partnership with State and tribal conservation agencies, an approach that has proven successful for nearly 70 years. At NRCS, we rely heavily on this nationwide network of State, tribal, and local partners to get cost-effective, science-based conservation on the ground.

Beyond the government conservation partnership, however, we also need more private sector initiatives and public/private partnerships, such as the On-Farm Environmental/Odor Assessment Review Project sponsored by America's Clean Water Foundation. Without question, animal agriculture industry-led initiatives, for example, can significantly increase the voluntary adoption of CNMPs to protect water quality.

The environmental and economic challenges faced by today's AFO owners and operators are complex and too significant for us to do anything less than commit to strong public/private partnerships that benefit our natural resources, the private landowner, and the American public.

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WATER QUALITY ISSUES FACING AGRICULTURE AND RURAL COMMUNITIES

Tony Prato
Professor of Resource Economics and Management
University of Missouri-Columbia

Summary

American society expects agriculture to provide high-quality and moderately priced food and fiber in a manner that protects air, soil and water resources. While environmental policies and programs have been successful in reducing water pollution from point sources, agricultural non-point source pollution is still a major problem. Agricultural-environmental policies and traditional technologies have been effective in reducing water pollution from agriculture. Newer production technologies, such as precision farming and GMOs, incentive-based policies, such as tradable emission permits, and information management technologies, such as geographic information systems, global positioning systems, remote sensing and Internet-based decision support systems, offer significant potential for achieving further reductions in nonpoint source water pollution. Community-based decision-making is a promising framework for addressing and alleviating adverse impacts of animal feeding operations on water quality and the quality of life in rural communities.

Progress and Challenges

When the Clean Water Act was passed in 1972, there was grave concern about the poor quality of the Nation's water. Before the Act, untreated water from point sources, such as municipalities, businesses and industries, caused widespread pollution of lakes, rivers and coastal waters. The National Pollution Discharge Elimination System (NPDES), which the Act mandates, requires wastewater treatment facilities to obtain permits for emitting water pollutants. The Act reduced pollutant loading by billions of pounds and doubled the number of swimmable and fishable water bodies. Despite this progress, agriculture is still the leading source of water quality impairment in rivers and lakes and the third ranked source in estuaries.

The Clean Water Act and farm programs, such as conservation compliance, Conservation Reserve Program, Wetlands Reserve Program, and Environmental Quality Incentives Program, have provided technical and financial assistance for farmers who adopt conservation practices for reducing soil erosion and agricultural nonpoint source pollution. Adoption of traditional conservation technologies has significantly reduced agricultural nonpoint source pollution. These technologies include reduced and no tillage systems, terracing, contour farming, more efficient and timely application of fertilizers and pesticides and others. For example, from 1977 to 1992, sediment delivery from cropland to water bodies decreased by about 740 million tons, or 38 percent. The goal over the next five years is to achieve an additional 25 percent reduction in soil erosion on cropland.

States report that close to 40 percent of sampled water bodies are too polluted for fishing and swimming. A major source of water pollution is runoff from farms, pastures, urban areas, and timber harvesting and mining operations. In addition, the ecological integrity of aquatic ecosystems, such as wetlands, stream corridors and coastal areas, has been compromised by urbanization, drainage of wetlands, modification of rivers and runoff containing nutrients, pesticides and livestock wastes.

Progress made in controlling nonpoint source pollution from cropland has been partially offset by increased pollution from other sources. Prime examples include *Pfiesteria* outbreaks in mid-Atlantic coastal areas caused by breached animal waste lagoons, fish deaths from wastewater equipment failures in confined animal feeding operations in the Midwest, hypoxia (low concentrations of oxygen) in the Gulf of Mexico caused by nutrient loading in streams and rivers of the Mississippi and Missouri River Basins.

In the case of hypoxia, the problem is exacerbated by the fact that nutrient loads to the Mississippi River from agricultural, urban and other sources are causing ecological degradation in the Gulf of Mexico even though nutrient concentrations in the river are substantially below the maximum contaminant levels for drinking water. It appears that the water quality standard needed to protect ecosystems in the Gulf is more restrictive than the standard for drinking water. In the case of North Carolina, lagoons overflowed because they were not designed to handle the intensity of storm events that occurred in the region. In my own state of Missouri, animal waste equipment failures have resulted in numerous fish kills.

New Production Technologies

New and emerging production technologies have the potential to further reduce adverse water quality impacts of agricultural production. Research on site-specific farming indicates that it can increase farm profitability and reduce the risk of water pollution under certain conditions. Application of genetically modified organisms (GMOs) to agriculture has led to development of new varieties that are resistant to certain herbicides and pests. Pest resistance reduces the use of pesticides, which can generate significant water quality benefits particularly in areas where soil and weather conditions pose a high risk of pesticide contamination. Other traits achievable with GMOs, like increased drought tolerance, could have significant benefits in areas of the country where rainfall is low, costs of groundwater pumping are high and/or weather variability increases as a result of climate change. On the other hand, GMOs pose certain ethical issues and social and environmental risks that must be assessed.

Policy

In addition to the Clean Water Act, many other federal and state agricultural policies have stimulated the adoption of conservation technologies and cropping systems that increase soil and water conservation. Instrumental programs include conservation compliance, which eliminated inconsistencies between commodity and conservation programs, the Conservation Reserve Program, which idled millions of acres of highly erodible cropland, the Wetland Reserve Program, which stimulated conversion of cropland to wetland, and a wide range of technical and financial assistance programs.

While the soil and water quality benefits of these programs are indisputable, their cost effectiveness has been called into question. Some analysts contend that the public cost of these

programs has been very high, and that removal of the subsidies for practices that improve water quality cause farmers to abandon them. Practices that have economic and water quality benefits (so called win-win situations) are the most enduring.

Another debate swirls around whether regulations or subsidies are the best approach for controlling agricultural nonpoint source pollution. For the most part, a regulatory approach has been used to control point sources, like the NPDES permits mentioned earlier. Incentive-based programs, such as cost sharing of soil and water conservation practices, CRP and EQIP, help to control agricultural nonpoint source pollution. In contrast, the decision to issue rules implementing the Total Maximum Daily Load (TMDL) requirement of the Clean Water Act sets into motion a regulatory approach to controlling all sources of water pollution in a watershed.

A policy option for reducing water pollution that is receiving considerable attention is tradable emission permits (TEP), also known as nutrient trading. TEPs require the regulatory agency to set an upper limit on total emissions from all sources in a particular area, such as a watershed. A TMDL is such an upper limit. The agency then issues emission permits up to the limit. Permits can be traded among sources at a price determined by demand and supply conditions and other trading restrictions imposed by the agency. Since permits can be bought and sold, a point source can buy emission permits from a non-point source and vice versa. For example, an industry that is a point source would be willing to buy permits from a farm that is a nonpoint source when the cost of controlling the point source is higher than the cost of controlling the nonpoint source. TEPs are economically efficient because they minimize the cost of achieving a desired reduction in total emissions.

Another policy issue is the extent to which phased deregulation of agriculture will decrease the use of cropping systems and farming methods that contribute to nonpoint source pollution. Some policy analysts argue that price and income supports cause farmers to use crop rotations that have adverse environmental consequences. As subsidies are phased out, farmers might select crop rotations that are less harmful to the environment. We will have to wait and see whether this occurs.

Information Technologies and Rural Communities

Communities are becoming increasingly concerned about the adverse impacts of agriculturally related air and water pollution on quality of life. One way to address this issue is to adopt a collaborative, watershed-based decision-making approach. This form of decision-making brings watershed stakeholders together for the purpose of developing site-specific strategies for improving water quality in a manner that maintains or enhances economic viability.

Rapid advancements in information technologies make it possible for communities to synthesize and evaluate the information needed to protect water quality. Examples of these technologies include geographic information systems, global positioning systems, remote sensing and Internet-based decision-support systems. Information technologies allow users to visualize spatial relationships within a watershed that are critical in controlling water pollution. For example, the center that I co-direct has developed a decision support system for Saline County, Missouri that allows users to determine the proximity of existing animal feeding operations to residential areas, roads, public drinking water supplies, streams, and public facilities, as well as identify the most suitable areas for future animal feeding operations. Information technologies substantially enhance the capacity of rural communities to develop and

evaluate strategies that minimize the adverse impacts of agricultural production on human health and natural resources.

Future Prospects

While water quality problems in the US pale in comparison to those occurring in many other parts of the world, they are nonetheless significant for people, communities and ecosystems at risk from water pollution. Advancements in production and information management technologies are increasing our capacity to reduce such risk. The challenge before us is to use these technologies and advancements in scientific knowledge to reduce adverse impacts of food and fiber production on water quality, people and the sensitive ecosystems on which people depend.

SUGAR POLICY NEEDS OF LOUISIANA CANE GROWERS AND PROCESSORS

Dean A. Gravois
President, Dean A. Gravois Farms, Inc.

Hello, and good morning. I am Dean Gravois. As John Love described in his introduction of me, I am a sugarcane farmer from Louisiana. My family and I operate more than 2,000 acres in Vacherie, a small town located along the Mississippi River, between New Orleans and Baton Rouge. If you are here today, you are already aware of the mounting problems facing the U.S. sugar industry. It is no secret that we have too much sugar. For the past few years, production has been rising and pressure from imports has been increasing. As a result, prices have been suffering. At even a cursory glance, the future appears terribly unstable.

To be successful, domestic sugar policy must address this supply imbalance, and it cannot do so unless it also integrates foreign-supplied sugar in a way that is both fair and reasonable. Failing that, the incessant import pressure created by the massively subsidized world dump market will overwhelm our efficient but unsubsidized farmers. For now, we have no balanced sugar market. Our market and our policy are in serious crisis.

To the outside observer, the answer to this crisis, at least for the individual farmer, should be simple: grow something else. That's supposed to be the most appealing aspect of Freedom to Farm, isn't it? Choose another crop. Find something that provides the stability and the revenue that sugar cannot provide. Yet, for the Louisiana sugarcane farmer, there is no flexibility. Growing sugarcane is what we do best. More than that, sugarcane is the *only* crop those of us in south Louisiana are able to grow successfully.

We have tried to grow other crops. Rice, soybeans, cotton, corn, you name it, we have tried it. Yet, due to the uniqueness of our soil and our climate, especially our weather extremes, sugarcane is the only crop we can grow effectively. It is perhaps ironic then that a significant reason for the increasing production in Louisiana has been the influx of acreage in the western and more central portions of our state that have traditionally been devoted to growing rice and soybeans. As prices for these other commodities fell, these farmers began searching for other crops, any crop, with which they could get some productiveness out of their land. So, they took AMTA and marketing loan payments received for other crops and used them to enter the sugar business.

Of course, the introduction of a new variety, LCP85-384, in Louisiana also explains our rising production. This new variety, specifically bred in Louisiana for our shorter growing season, has been a boon, improving yields, increasing stubbling ability, and lowering fixed costs per unit as compared to the older varieties. As more and more land has been planted with this new variety, both efficiency and production have increased.

Industry yield of sugar per acre in the last three years (1998-2000) has averaged 43 % higher than the three years prior to LCP85-384 occupying significant acreage in Louisiana (1991-1993). Additionally, growers have kept at least one or two extra stubble crops of the new variety before having to fallow the

land for replanting. This has allowed for an expansion in harvested acreage in existing production areas – a comparison of the same periods of years shows a 26 % increase. The combined increase in yield and harvested acreage has resulted in an increase in total sugar production in Louisiana during the last decade of 75 %. This type of production increase, and subsequent efficiency, is what our government and our detractors contend we should be doing in order to be more competitive. Well, we're there! And what do we get for it – no price!

As a result of higher yields and subsequent lodging that occurs with this heavier cane, a new harvest system was required to capture the potential of this new variety. This has meant an investment of some half million dollars per unit for a combine harvester, high dump transport wagons, tractors, and highway transport trailers. Industry wide, this amounted to an investment of some $200 million. This is a huge investment for an industry whose future appears terribly unstable.

Without the enhanced efficiency that the new variety and harvesting system offer, we could not survive. As long as production outstrips demand, nationwide and worldwide, and as long as the pressure from imports sits on our market like an 800-pound gorilla, the only way our industry can survive is to lower per unit costs. To do this, our mills need greater and greater amounts of cane to grind. Thanks to this new variety, and the years of research and millions of dollars needed for its development, our farmers can meet these mills' growing need for more cane. Yet, research such as this is only one part of the high investment required to produce sugar from cane, and is only one facet of an integrated network that comprises our agriculture community.

Growing sugarcane is long-term commitment since, as a multiyear crop, a farmer can make four and sometimes five harvests off a single planting. It also means that the investment horizon is every long. Because it is a perishable crop, farmers have a very short period of time to get harvested cane to the mill for processing. From the moment a stalk of cane is cut, the sugar inside it begins to deteriorate. So, farmers rely on quick and easy access to a mill. In turn, the mill requires a certain amount of cane throughput, in order to cover all the capital and labor that go into a running mill. To build and equip a modern mill in Louisiana costs upwards of more than $100 million. After adding to this the millions more that are needed annually to operate the mill and to keep up with technology, it quickly becomes obvious that running a mill is a very expensive proposition. In this day and time, it is now necessary for a raw sugar mill to be processing a million or more tons of sugarcane annually in order to hope for black, rather than red, ink on its financial statement. Unfortunately, even this volume of cane alone is no guarantee of profit for the cane processing side of the industry.

As you can see, the survival of every local farmer, and his commitment of cane, is crucial to the survival of the mill. If even two farmers in a growing area go out of business or, if they're able, use their land for some other purpose, the stability of the mill begins to weaken. If the price of raw sugar falls lower, and a larger fraction of farmers goes out of business, the mill can lose enough cane supply that it, too, will slip under. At this point, the remaining farmers now must find another place to grind their cane. A mill further away will mean higher transportation costs and greater deterioration rates of cane. If the new costs are too high, then many of these farmers will go out of business. For some mills and many farmers, the squeeze between costs and price has been too tight. We have already lost three mills in Louisiana since 1995, and is destined to lose more mills in the very near future.

And, as with all of rural America, as farmers and mills go out of business, the communities that support them and are supported by them suffer greatly. The symbiotic relationship between the farmer and the processor that plays such an important role within the community can unfortunately serve to magnify the threat of economic disaster. Something as simple as two lost farmers can have a domino effect, directly impacting the viability of the mill. This, in turn, impacts other farmers and, consequently, can bring economic devastation to one or more rural communities.

Given the link to his mill, to his fellow farmers, and to the rest of his community, a decision by a farmer to leave sugarcane cultivation assumes even greater significance than such an important business decision might otherwise entail. Couple this fact to the inability by many in south Louisiana to grow anything other than sugarcane, even if they wanted to, and you begin to see the deeper irony within the "freedom" offered by current farm law. Not only do I not have easy flexibility to grow another crop, but this flexibility that is so crucial to the survival of other farmers can actually threaten my livelihood, my mill, and my community, since other non-sugar farmers can choose to add more production into my market.

So, where does this leave Louisiana as we try to develop a workable sugar policy? Clearly, no program will work unless supply and demand are in balance. In the current market, this means that imports should exist as a residual supply. This also means that the stuffed molasses loophole must be plugged. And it means that some reasonable solution to the dispute with Mexico must be found.

The side letter agreement to NAFTA sets out a structure of transition until the common market arrives in 2008. In rejecting the validity of the side letter, Mexico rejects an appreciation for the importance of a stable transition. Indeed, their reaction to NAFTA seven years ago was to fund an explosion of their industry through financing arrangements that amount to nothing more than billions of dollars of free capital. A large portion of a Louisiana mill's cost of production is dedicated to financing the plant and capital. So far, mills in Mexico have not had to face up to this fundamental cost of doing business, nor to other pressures of competition that have utterly transformed the U.S. industry. As I mentioned, in Louisiana we have already lost several mills. For the past twenty years, we have faced competition from high fructose corn syrup and have rationalized our industry and our market accordingly. To develop a mature industry, Mexico must face the same process of rationalization with HFCS. We will not let Mexico throw upon us the burden of doing it for them. If a reasonable solution to the side letter dispute cannot be reached, the U.S. industry will have no choice but to institute antidumping and countervailing lawsuits. We stand ready to do so!

Now, I can already hear the criticism that comes from those opposed to our sugar program. Why shouldn't we simply open up our market completely? Isn't "Freedom to Farm" rested on the principle of free markets? The simple answer is that while we may wish for a free market within our country, there is and never has been a free and unfettered *global* market in sugar, and that is a shame. I believe in a free market and so do my colleagues within the U.S. sugar industry. That is why we were the first commodity to support genuine, multilateral free trade at the outset of the Uruguay Round negotiations. Yet, very few of our global competitors are willing to risk sharing that sentiment. Virtually every one of the nearly 130 countries that produces sugar supports its industry in some significant way. Export subsidies, production subsidies, state trading enterprises, financing subsidies, alcohol subsidies. These programs all exist beyond our borders, not within. The accumulated result of all of these foreign subsidies is a world dump market that bears no resemblance to a free market. The world price averages barely half the world's average cost of production, which is why none of our trading partners who target

our market are willing to open their own borders. Though we are very efficient sugar producers, and can compete in a truly liberalized and unfettered global market, we cannot be subjected unilaterally to these distortions and dangers created by foreign governments.

Until the global market is truly unfettered and truly free, we need a sugar policy that is both realistic and fair. We must find a way to balance supply and demand. And we must find a way to reward efficient American production rather than foreign subsidized production. Why should the hard work and huge investment of our sugar farmers be penalized by policies that protect other WTO and NAFTA nations?

As all of you know, sugarcane production is a risky business these days. Nevertheless, I am in it for the long haul, come hell or high water. Sugarcane has been cultivated continuously in Louisiana for more than 200 years, longer than anywhere else in this country. It is an inextricable part of our culture. Its roots run as deep within us as the French language, Creole cuisine, and Cajun music that define us. I am very proud to be a part of this unique, organic community and I will give everything I have to leave it better than I found it.

GOVERNMENT POLICY CONCERNS

Tom McKenna
President
United Sugars Corporation

(See Chart 1)
Thank you for the introduction John. Good morning Ladies and Gentlemen.

My goal for the next 10 minutes is to share with you a Sugar Marketers perspective regarding Government Policy Concerns for the Domestic Sugar Industry.

I plan to review the type of market attributes both buyers and sellers should expect for Agricultural Commodity Product markets, like sugar.
And we will follow that review with discussion about the Crisis the domestic sugar industry finds itself in today.

I will also address why the government has a role and a responsibility to restore order to the domestic sugar market along with an itemized list of Major Policy Concerns and how they should be addressed in the near future.

Commodity Market Needs: *(See Chart 2)*
I am proud to be a part of one of the world's most efficient and sophisticated sugar production and delivery systems that is highlighted with "just-in-time" delivery of large quantities of high-quality sugar.
But, I am very concerned about the crisis the domestic sugar industry is in due to problems with government domestic and foreign trade policies.

As this chart shows, Efficient Commodity Markets demand that buyers and sellers have a reasonable understanding of: 1) Product Availability 2) Price Predictability 3) Opportunities for efficient participants to invest in their businesses 4) and lastly but most importantly, the need for sound, well thought out, government policy that supports stability in these market attributes.

Domestic Sugar Industry"Period Of Extreme Uncertainty": *(See Chart 3)*
The domestic Sugar Industry is in a Period of Crisis and Extreme Uncertainty. The primary underlying reason for the problem is that Government Policy, as it relates to the sugar industry, is not effective.
The results are evident: 1) last year we experienced the lowest market price for sugar in close to 20 years. 2) as a result, at least 50 % of the domestic sugar industry is in a radical "shake out" while 3) most all participants have put facility reinvestment needs on hold.

Current domestic and foreign trade policy, relating to sugar, is not providing needed supply and price stability. As a result, buyers have an increased risk of uncertainty of supply, reduced dependability of delivery and future expectations for lower quality sugar from foreign suppliers in the absence of effective U.S. Sugar policy

Role of Government in Restoring Order to U.S. Market: *(See Charts 4&5)*
Some ask …. "Why should the Government play a role in restoring order to the U.S. Sugar market?"

Marketers believe that the government needs to recognize the uniqueness of all domestic agriculture, including sugar cane and beet growers.
Government's role is:
1) to supply basic food needs

2) to provide economic viability to rural crop growing areas

3) and, to correct failed government policy that contributed significantly to the current crisis in the domestic sugar industry.

Government policy oversupplied the domestic market with foreign sugar by agreeing to:
1) overly generous foreign trade agreements

2) by failing to control U.S. borders

3) and by lacking realistic consideration for the negative impact of their foreign trade policies on domestic sugar growers and processors

Major Sugar Policy Concerns: *(See Charts 6&7)*
Noted on the next two charts are 4 major policy concerns:
1) "Stuffed Molasses" which is the illegal entry of foreign sugar

2) uncertainty of Mexican Sugar imports under the NAFTA Agreement

3) the threat of Tier ll Mexican imports

4) and continued increases in the importation of foreign sugar containing finished products that the government does not account for under its current policies.

Sugar Policy Actions: *(See Charts 8&9))*
To restore reasonable order to the industry, now in severe distress, government policy needs to:

1) close the illegal entry of foreign sugar called "stuffed molasses"

2) resolve the NAFTA issues so Mexican imports can be defined

3) eliminate the Tier ll threat from Mexico

4) account for the foreign sugar that enters this country in finished products and lastly

5) to keep these types of issues in mind when entering into new foreign trade agreements

Summary: *(See Chart 10)*
In summary, the domestic sugar industry is in a severe crisis caused by problems with failed government domestic and foreign trade policies.
The government does have a role and a responsibility to restore order.

The steps they need to take very soon include:

1) correcting the overly generous foreign trade agreements

2) eliminating the illegal entry of foreign sugar in "stuffed molasses"

3) accounting for all foreign sugar imports to U.S.

4) and last but not least, learning from past mistakes so it never happens again.

Government Policy Concerns

Sugar Marketers Perspective

Tom McKenna, President
United Sugars Corporation

Commodity Market Needs

- Product Availability
- Price Predictability
- Adequate returns to allow re-investment for efficient buyers and sellers
- Supportive Government/Regulatory Policy

Domestic Sugar Industry "Period of Extreme Uncertainty"

- ***Government Policy is not effective***
  - Lowest market price in about 20 years
  - Rapid "shake-out" in domestic industry
  - Re-investment on hold for many processors

Role of Government in Restoring Order to U.S. Market

- Recognize uniqueness of domestic agriculture
  - Supply food needs
  - Provide economic viability to rural areas
  - Failed government policy contributed to current domestic sugar crisis

Role of Government in Restoring Order to U.S. Market

- Government Policy oversupplied domestic market with foreign sugar
  - Overly generous foreign trade agreements
  - Failed to control U.S. borders
  - Lacked realistic consideration of negative impact on domestic growers and processors

Major Sugar Policy Concerns

- **Increased Entry of Foreign Sugar in the Domestic Market**
  - "Stuffed Molasses" imports containing foreign sugar
  - Mexican Sugar Import Uncertainty

Major Sugar Policy Concerns

- *Increased Entry of Foreign Sugar in the Domestic Market*
  - Threat of Tier II from Mexico
  - Finished Product Imports containing foreign sugar

Sugar Policy Actions

- Close illegal entry of foreign sugar
  - "Stuffed Molasses"
- Resolve NAFTA issues
- Eliminate Tier II threat

Sugar Policy Actions

- Account for foreign sugar in imported finished products
- Take into account impact when entering new foreign trade deals

Summary

- Domestic Industry is in Crisis
  - Failed Government Policies
- Government has a role to restore order
  - Correct overly generous foreign trade agreements
  - Eliminate illegal entry of foreign sugar
  - Account for all foreign sugar imports
  - Learn from past mistakes

ANIMAL PRODUCTION AND AIR QUALITY

John M. Sweeten, PhD, P.E.
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Introduction

Concentrated animal feeding operations (CAFOs) as defined by USEPA are necessary for U.S. producers to meet growing domestic and world demands for livestock and poultry products. To maintain a safe and economical food supply, CAFO owners and operations must have access to cost-effective technologies, resources and sufficient lead-time to adjust to changing public agendas regarding air quality protection without disrupting the food supply. The USDA Agricultural Air Quality Task Force, created pursuant to the 1996 Farm Bill, identified air quality issues, approaches, and national research and education program needs associated with CAFOs (AAQTF, 2000). The following is a summary[1/] of that task force report prepared by a select group of scientists, engineers, producers, and public policy officials serving on the AAQTF. For further details, the reader should refer to the full text of that report on-line at http://www.nhq.nrcs.usda.gov/faca/Policies/CAFO.htm and many of the 100 or so references cited therein.

Discussion

Issues Overview

Animal agriculture in the United States is a $100 billion/year industry. The U.S. is the world leader in efficiency of producing meat, milk, poultry and eggs, as a direct result of increased development of concentrated animal feeding operations (CAFOs). The percentage of domestic livestock in concentrated animal feeding operations varies nationally and regionally by species from only 10% of the nation's beef cattle inventory to virtually 100% of swine and poultry. CAFOs have been closely regulated for the last 28 years or more under federal and state clean water laws, regulations and policies, and considerable funding has been directed to water quality research, demonstration, education, and technical assistance for CAFOs. Until recently, air quality from CAFOs has received only secondary consideration, notwithstanding recently-increased public concerns and policy attention. Water and air quality protection are inseparable, and the CAFO-related research, technology transfer, and federal and state programs should be linked accordingly and funded adequately, at levels commensurate with public concerns and with rapidly-developing scientific expertise at land grant universities and federal laboratories. Producers will need adequate lead-time, cost-effective technologies, and resources to adjust to changing public agendas that include air quality protection.

[1/]Adapted from: Sweeten, J. M., L. Erickson, P. Woodford, C. B. Parnell, K. Thu, T. Coleman, R. Flocchini, C. Reeder, J. R. Master, W. Hambleton, G. Bluhm, D. Tristao. 2000. Air Quality Research and Technology Transfer White Paper and Recommendations for Concentrated Animal Feeding Operations. Confined Livestock Air Quality Committee, USDA Agricultural Air Quality Task Force, Washington, D. C., July 19. 123 p.

CAFO Air Quality Parameters

CAFOs including swine and poultry operations, dairies and cattle feedlots, can affect air quality through emissions of: odor, odorous gases (odorants), particulates, and/or some of the so-called greenhouse gases. Sources include: open lots and confinement buildings, manure/wastewater storage or treatment systems, land application, and animal mortalities. Emissions load on the atmosphere is the product of contaminant concentration and airflow rate; and research is underway to develop and demonstrate cost-effective ways to reduce either or both these basic components.

Odor from CAFOs sources, as experienced by humans, is the composite of as many as 170 or more specific gases, present in trace concentrations either above or below their olfactory thresholds. Odor is characterized according to: strength (concentration or intensity), frequency, duration, offensiveness, and hedonic tone. Odor strength is measured by various types of dilutions-to-threshold devices (olfactometers) using human odor panelists; by determining the identity and concentration of individual odor gases; or by electronic "noses", which are in their infancy. Reproducible techniques for odor/odorant sampling, storage and transportation, and presentation to panelists have been developed, yet are undergoing further rapid development worldwide, because of high cost and labor requirements.

Odorous gases of concern today include ammonia and hydrogen sulfide. Considerable research in Europe and more recently in the U.S. has been devoted to monitoring these two fixed gases in and around confinement buildings, partly in relation to animal and human health concerns, and within and around open feedlots and dairies. However, the importance of ammonia and hydrogen sulfide to downwind composite odor as perceived by neighbors is questionable, according to evidence to date. Nevertheless, so-called emissions inventories that include data from often dissimilar systems in Europe have been compiled by EPA and used unwittingly in some states, despite thin and often specious databases.

In the U.S., ammonia emissions have long been encouraged as a legitimate means of balancing the nutrient equation for water quality protection purposes. Feeding and manure/wastewater management systems have been designed accordingly on a widespread basis. A reversal of form of a rather structural nature will be needed as water and air quality protection are now to be viewed conjunctively.

Field and laboratory research has largely focused on measuring concentrations of odor (e.g., odor units (OU)) or odorants (e.g., micrograms/cu. meter, or ppm) in air within and in close proximity to confinement buildings and open lot feeding systems. However, assessments of air quality impact also requires data on:

- emission rates (mass/unit time), e.g., kg/day;
- flux rates (mass/unit area/unit time), e.g., kg/sq. meter/day;
- emission factors (mass/unit of throughput/unit time), e.g., kg/head/year.

The AAQTF (2000) found a substantial number of data sources from the U.S. that provided *concentration data* from swine operations or from laboratory studies involving swine manure; not surprisingly, the preponderance of this data comes from the upper Midwest or from the mid-Atlantic states. Interestingly, ammonia emissions appear to occur with diurnal fluctuations, while hydrogen sulfide emissions occur in bursts from anaerobic storages or lagoons. To a lesser extent, similar data exists from poultry (Midwest and Southeast), dairy (Midwest, Northeast, and West Coast), and beef feedlot operations (Southern Great Plains and West Coast). However, a paucity of data exists on *emission rates*, *flux rates*, and *emission factors* from these sources and the many different manifestations of manure and wastewater management systems within each species. Where such data has been

reported, it shows a wide range; consensus numbers appear elusive. Further research by well-qualified and well-equipped laboratories is needed as a precursor to rational attempts to develop policies for CAFO odor and odorants.

It is believed that future research will be directed toward odorous gases that more closely correlate with odor as perceived by humans--the discerning public: Candidate compounds may include volatile organic compounds (VOCs) such as the volatile fatty acids, amines, alcohols, aliphatic aldehydes, p-cresol, indole, skatole, or mercaptans. The above comments on data quality and standardization of useful expression will apply as alternative compounds are studied and attempts made to relate them to odor.

Unlike odor and odorants, particulates have been explicitly regulated as one of six criteria pollutants under the Federal Clean Air Act since the 1960's. Total suspended particulate (TSP) standards for ambient air quality were replaced by PM_{10} standards in 1987, and recent USEPA proposals have addressed fine ("respirable") particulate, regarded as $PM_{2.5}$. Particulate sources from CAFOs include: feedmills, feedstuffs storage and handling areas, open lots, confinement buildings, roads and alleys, manure handling, solid manure storage or composting areas, and land application. Except for feedmills, these sources have been regarded as fugitive emission sources.

It has long been known that carbon dioxide and methane (non-odorous fixed gases of digestion and organic matter decomposition) are produced both by confinement and range/pastured livestock and poultry. Refinements in animal rations have improved digestibility, reduced manure loads, and shortened the production interval of meat animals, and thereby contributing to lowered emissions. With appropriate incentives for adoption, known technology for energy recovery from liquid manure treatment systems, together with state-of-the art open lot manure and holding pond management practices, producers may be able to further reduce emissions of these so-called greenhouse gases, which are not part of the regulatory fabric regarding air quality.

Emission Factors

Using old total suspended particulate (TSP) databases developed for other purposes, USEPA and its contractors of the 1970's extrapolated and subsequently synthesized original emission factors (published in AP-42) that have since been proved atypical by subsequent research. Refinements are in progress based on more accurate recent data that includes actual PM_{10} field measurements and modeling for cattle feedlots in the Southern Great Plains, where over 75% of he nation's beef cattle are fed for slaughter. Attempts to extrapolate air quality data from beef cattle feedlots over to dairy applications or other species or vice versa are ill-advised. It has proved inordinately difficult to correct poorly-conceived emission factors, notwithstanding new, superior data. Therefore, improved processes for updating emission factors for an array of CAFO-related air contaminants in the future should be developed.

Available data bases on $PM_{2.5}$ for CAFOs are very thin or nonexistent, although a few laboratories are becoming equipped to supply this data in the future for dairies and feedlots (California and Texas, for example). Evidence exists of rapid, predictable fluctuations of PM concentrations from open lot and animal confinement buildings alike owing to periods of heightened animal activity as triggering mechanisms, over and above more or less basal PM emission levels, possibly suggesting future topics of research and innovation, along with conventional control technologies.

Human Response and Health Effects

Concerns with health effects of odor, odorants, and PM from CAFOs extend to livestock health/performance issues, and to humans working within or living in proximity to such facilities. These

health-related issues, and applicable prevention technologies, may or may not be coupled. It appears that confinement swine facilities have been the focus of most of the research to date, followed perhaps by the poultry industry, as confinement buildings are the sites of highest air contaminant concentrations and exposure durations. One of the artifacts of increased animal concentration and industry consolidation may be an increased industry capacity to address both the on-farm as well as off-farm issues regarding potential health effects. Recent evidence suggests greater secondary health effects on frequently-exposed neighbors than previously documented, insofar as confined swine operations are concerned.

Current Federal and State Policies

Federal and state policies regarding CAFOs have been in existence for decades. Water quality concerns were addressed in the Federal Water Pollution Control Act of 1972, which listed CAFOs as point sources. Accordingly, federal effluent limitation guidelines (ELGs) and National Pollutant Discharge Elimination System (NPDES) or state-equivalent permits soon followed, and these were one-dimensionally focused on protecting surface water quality through no-discharge requirements. As documented in this report, individual States, and more recently USEPA regions (e.g., Region 6), subsequently have followed suit by adopting a virtual patchwork of tailored policies and regulations that have attempted to address voids of groundwater protection and nutrient management, and in a minority of cases air quality concerns, that were not addressed in USEPA's 1974-76 ELGs, which are still in effect. It is notable that USEPA has released for comment the basic concepts to be embodied into new ELGs for CAFOs (USEPA, 2001).

Integrated Programs

USDA agencies, land grant universities, and private industry associations, often times in partnerships with USEPA, local soil and water districts, and state environmental protection agencies, have launched coordinated research, education, training, technical and financial assistance programs to address water quality concerns and to enable the progressive attempts of CAFO operators to design and operate manure and wastewater management systems that address extant public policies as well as improve performance, productivity, beneficial use of nutrients, and minimize liability with respect to neighbors. Despite lingering problems in some areas or specific watersheds and notwithstanding public funding limitations, these programs plus the infusion of massive private investments on the part of CAFO operators have largely addressed the nation's water quality concerns and kept enormous quantities of manure and wastewater from being discharged off site and into streams, but rather put to beneficial use on crop or pasture land either on- or off-premises. Current or previous partnerships include the USDA interagency Water Quality Initiative, USDA/NRCS EQIP program; the National Pork Producers Council's Environmental Quality Assurance Program; and the new USDA/USEPA Unified National Strategy for Animal Feeding Operations, which will involve development of comprehensive nutrient management plans (CNMPs) for CAFOs. These are laudable programs.

However, no integrated counterpart programs to address air quality from CAFOs have been funded or developed. As a result, many operators may have facilities or systems optimized for water quality protection, but non-optimal with respect to emerging air quality objectives. It will take considerable time, investment, and a full measure of integrated, coordinated programs of research, education, training, technical and financial assistance to address air quality concerns adequately and co-extensively with water quality protection. Recent reactive, enforcement-related forays to target selected, individual operations with exposure to hazardous waste regulations designed for industry other than animal agriculture appear ill-conceived and counter to the systematic development and progressive implementation of an array of technologies that can ultimately find pervasive adoption by the CAFO industry of scientifically-sound, appropriate air pollution control technologies.

Odor Control Technologies

How can odor and odorants be satisfactorily controlled? There are four basic approaches, with multiple technologies that have possibilities within each approach:

- Ration/diet manipulation -- reduced protein levels; improved carbohydrate, nitrogen and sulfur utilization; synthetic amino acid supplementation; improved energy balances; copper supplementation (swine only); etc.
- Manure treatment -- aerobic conditions in surface manure (feedlots); drainage; frequent manure harvesting; lightly-loaded/facultative lagoons; multiple stage lagoons; surface aeration of lagoons or storage pits; experimental biochemical amendments; etc.
- Capture and treatment of emitted gases -- reduced liquid manure surface area; wet or dry scrubbers; dust control; biofilters; lagoon or storage pits covers; chemical oxidant surface sprays; non-thermal plasma reactors; etc.
- Enhanced dispersion -- excellent site selection; absence of confining valleys; adequate buffer distance; tree barriers; deflection walls (air dams); exhaust stacks; dispersion modeling; etc.

It should be cautioned that some of these technologies are as yet experimental in nature, or practical applications may not have been demonstrated. Likewise, selection of control technologies should be tailored to sources within site-specific circumstances that include facility design and management factors, climate, topography, and potential receptors.

Dust Control Technologies

Likewise, technologies for particulate (dust) control from open-lot feeding systems are available and include: frequent manure removal, stocking density adjustment to take advantage of excreted manure moisture, and where needed water sprinkling. Use of vegetable oil sprays has been demonstrated for use in swine confinement buildings, and terpenic sprays has reduced airborne bacterial infections in calf confinement barns. Speciation of CAFO-related dusts in contrast with ambient dusts from upwind operations (e.g., field dust from crop production operations) have not been determined heretofore.

Research Programs Needs: Health Effects

Worker health from exposure to dust, odor and odorants inside swine confinement facilities has received most of the attention regarding health-related issues of CAFOs. Respiratory diseases or conditions are generally more common among swine confinement building workers than among cohorts not similarly exposed. Commonly used design and management practices have been altered accordingly.

Recent attention has been paid to health complaints of rural residents neighboring large-scale swine confinement operations, with preliminary signs of mood states such as tension, anger, depression, or fatigue showing up recently in community surveys or epidemiological studies. Hydrogen sulfide is a suspected contributor. Linkages, if any, between concomitant control of odor, hydrogen sulfide, or any other specific gases, should be examined in future studies.

Research Funding Levels

Funding levels for air quality research regarding CAFOs are elusive. The GAO reported agency investments in a wide array of animal waste-related research (USDA-ARS averaged of $5.65 million per year (FY96-99) and USDA-CSREES reportedly $6.9 million in FY97), as compared to $15.7 million of state funds. However, the amounts attributed only to air quality were not reported separately, and are a subset of these totals. Current estimates by USDA-ARS are that the total amount in ARS projects that have expected outcomes of air quality enhancement is $2.9 million/yr (Amerman, 2001). USDA-

CSREES identified 39 state research projects with some aspect of air quality in the project (Hegg, 2001). USEPA investments in agricultural air quality research are not reported and are likely miniscule. Both USDA and USEPA need to come to the table with enhanced long-term funding packages and programs for agricultural air quality research and technology transfer that specifically address CAFOs.

Research and Technology Transfer Needs

Numerous research and/or technology transfer needs and opportunities were identified (AAQTF, 2000). In brief, these include:

- Develop accurate and broadly applicable emission concentrations, rates, and emission factors for PM, odor and specific odorants applicable to CAFOs;
- Define emission rates as a function of diurnal, seasonal, and climatic variations, as well as design and management practices;
- Develop effective, practical odor control technologies for confined animals, manure and wastewater treatment, and land application systems;
- Determine relationships among odor, odorants, particulates and airborne microbial species;
- Identify kinetic release mechanisms for odorants and odor from principal manure sources;
- Target the development of control technologies that will specifically address the odor/odorant kinetic release mechanisms;
- Develop practical ways, capable of widespread adoption, of reducing ammonia from CAFOs;
- Effectively transfer appropriate, economically viable technologies for odor control to producers;
- Develop innovative air treatment processes for confinement building exhausts or covered lagoon surfaces;
- Develop odor reduction treatments for application immediately prior to land application;
- Develop accurate standardized measurement technologies for odor, odorants of principal concern, and fine particulate, and ensure these systems become widely available for research and demonstration; this should include sensory, chemical-specific, and electronic measurement devices that are well-correlated with the human odor experience;
- Develop accurate dispersion models for odor, odorants, and PM appropriate to specific types of CAFOs, addressing the inherent problems of Gaussian models;
- Characterize air quality as a function of distance from large CAFOs;
- Implement cooperative industry/agency/university programs for scientific evaluation of new products for producers' consideration and adoption;
- Assess the importance of indoor air quality at CAFOs and devise ways to reduce exposure levels;
- Devise suitable acceptability criteria for community-level exposure to odor and specific associated gases;
- Assess potential relationships between emission constituents, concentrations, and potential health indicators, and devise appropriate mitigation strategies accordingly;
- Establish partnerships with health research organizations and centers, identify potential health concerns associated with CAFOs and proactively address any identified issues.

Programmatic, Industry, and Community Relationships: A Discussion

In summation, air quality agencies need to recognize that the U.S. excels and will continue to excel in animal agriculture. Industry consolidation is a response both to securing positions of high productivity and adjusting to widely-recognized and increasing environmental protection responsibilities. Producers need to recognize that those technologies that were optimized for water quality protection may now seem insufficient for protecting air quality, which tends to be even more regionalized in terms of problems and solutions. Margins of community acceptance that were present when animal feeding

operations were dispersed and small (by today's standards) with individual farmer ownership may no longer exist as operations grow by orders of magnitude and become more complex in structure. Nor will relatively straight-forward technologies for controlling water pollution likely be considered adequate for the more complex air quality issues. Fortunately, there are promising technologies either available or being developed that can significantly reduce emissions of odor, odorants, or dusts, as appropriate. None of these technologies are free or even especially cheap; but neither are alternative legal remedies. Partnerships among industry, agencies, universities, research and technology transfer institutions, and the public will be the best and longest-lasting means of abating CAFO air quality problems that exist in parts of the country or in isolated instances. The nation remains far under-invested in development of technologies to assess and abate air contaminants from CAFOs, and as such seems in danger of reacting inappropriately with policies that are far ahead of the science or industry's ability to adapt in a timely fashion.

A program of accelerated research, education, technical training, technology transfer, and financial assistance to cope with CAFO air quality problems is strongly recommended. The USDA Agricultural Air Quality Task Force, established under the 1996 Farm Bill, has a stake in designing and fostering the implementation of these proactive, progressive programs.

Executive Summary

CAFO Air Quality Parameters: Odor and Odorants

- CAFOs can affect air quality through emissions of odor, odorous gases (odorants), particulates (including biological particulate matter), volatile organic compounds and/or some of the so-called greenhouse gases.

- Odor from CAFO sources, as experienced by humans, is the composite of as many as 170 or more specific gases, present in trace concentrations either above or below their olfactory thresholds.

- The primary odorous gases of concern include ammonia and hydrogen sulfide. However, the importance of ammonia and hydrogen sulfide to downwind composite odor as perceived by neighbors is questionable or negligible.

- Field and laboratory research has largely focused on measuring concentrations of odor. Data on emission rates, flux rates and emission factors are needed to develop science-based policies for the reduction of CAFO odor and odorants.

- Future research should be directed toward determining those odorous gases that more closely correlate with odor as perceived by humans.

- Carbon dioxide, methane and non-methane reactive organic gases are natural products of manure decomposition. Strategies to reduce emissions of odor and odorants are likely to reduce emissions of these co-product gases.

Emission Factors

- Improved processes for updating emission factors for an array of CAFO-related air contaminants, such as PM_{10}, $PM_{2.5}$, volatile organic compounds and ammonia should be initiated and accelerated.

Human Response and Health Effects

- Concerns with health effects of odor, odorants, biological and other particulate matter from CAFOs include livestock, employees and neighbors. Recent evidence suggests greater secondary health effects on frequently exposed neighbors than previously documented.

Current Federal and State Policies

- Water quality concerns were first addressed in the Federal Water Pollution Control Act of 1972, which listed CAFOs as point sources. A patchwork of tailored policies and regulations has attempted to address voids of groundwater protection and nutrient management, and only in a few cases have air quality concerns been addressed.

Integrated Programs

- Integrated programs to address air quality from CAFOs have not been funded or developed. A collaboration of agencies is needed to work with issues associated with CAFOs and air quality, just as similar collaborative activities have succeeded in regard to water quality.

Odor Control Technologies

- There are four basic approaches to control odor and odorants: ration/diet manipulation, manure treatment, capture and treatment of emitted gases and enhanced dispersion. Each approach has multiple technologies that need to be tailored on a site-specific basis.

Dust Control Technologies

- Technologies for particulate (dust) control from open-lot feeding systems, where needed, include frequent manure removal, stocking density adjustment to take advantage of excreted manure moisture and water sprinkling.

Research Funding

- A program of accelerated research, education, technical training, technology transfer and financial assistance to address CAFO air quality problems is strongly recommended.
- USDA and EPA funding levels have not been adequate to address or solve air quality problems associated with CAFOs.
- *The AAQTF (2000) recommended at least $12.8 million per year for coordinated, integrated programs for animal agriculture, as part of the additional $65 million in total funding requested for agricultural air quality.*

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THE OUTLOOK FOR NUTRACEUTICALS AND FUNCTIONAL FOODS

Dr. Karen Lapsley
Director of Scientific Affairs, Almond Board of California

Speech Outline

1) Definitions of functional foods and nutraceuticals.
2) Overview of Japanese market.
3) U.S. retail food sector with subdivisions for functional foods.
4) Health trends in USA.
5) How interest in phytochemicals and antioxidants brings fruits and vegetables into functional foods arena.
6) Overview of health claims in USA.
7) Other food industry trends which could benefit the fruit and vegetable sector.

Overview

In the U.S. market, where inflation and population growth are the only ways to increase earnings, functional foods remain of keen interest to food corporations (Aarts, 2000). The challenge is to define exactly what functional foods are and how healthy, convenience trends fit into this market sector. As the U.S. population ages (1996—33% 45 yr. + to 2030—42% 45 yr.+) health concerns increase with "positive eating" and "self care" becoming mainstream (Sloan, 2000).

U.S. functional food sales reached $14.8 billion in 1998 or 3% of retail food sales; mainly from beverages, energy bars and dairy products. The natural/organics and "lesser-evil" food categories were over $50 billion and , therefore, larger than functional foods alone. It is important to realize there are lots of opportunities for growth for the fruit and vegetable sector within the "market standard"--$450 billion.

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The Outlook for Nutraceuticals and Functional Foods

Dr. Karen Lapsley - Director of Scientific Affairs

ALMOND BOARD OF CALIFORNIA

Nutraceutical – An American term

S. DeFelice MD, Foundation for Innovation in Medicine

A nutraceutical is a product isolated or purified from foods that is generally sold in medicinal forms not usually associated with food. A nutraceutical is demonstrated to have a physiological benefit or provide protection against chronic disease (Health Canada 1998).

There Is No Legal Definition For Functional Foods Anywhere in the World

Working Industry Definition:

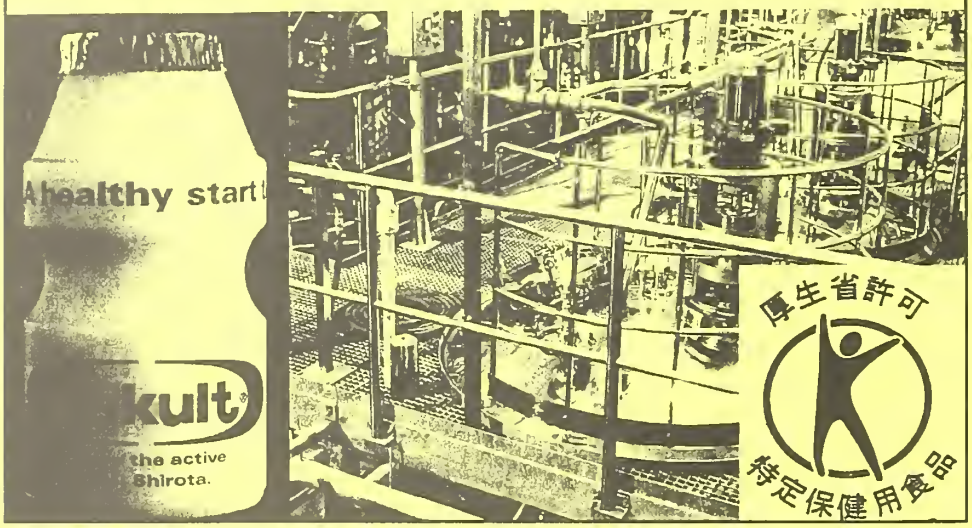
"Foods that may provide a health benefit beyond basic nutrition"
(International Food Information Council)

- **Traditional and whole foods**
- **Processed +/or fortified foods**

Why did "functional foods" develop?

East		West
Japan	**1980-1995**	**America**
•Health costs rising •Population aging •Food industry stagnant •Relation between food and health well accepted by consumers and regulators •FOSHU was created		•Relation between food & health NOT well accepted by doctors or regulators •Consumers demanded nutrition labelling for foods •Self care movement •Health claims allowed

World's Leading Functional Food - 27 million bottles/day



Japanese Functional Food Market

- 1920-30's development of bifidus drinks
- 1970's boom in sports drinks
- 1980-90's FOSHU System initiated

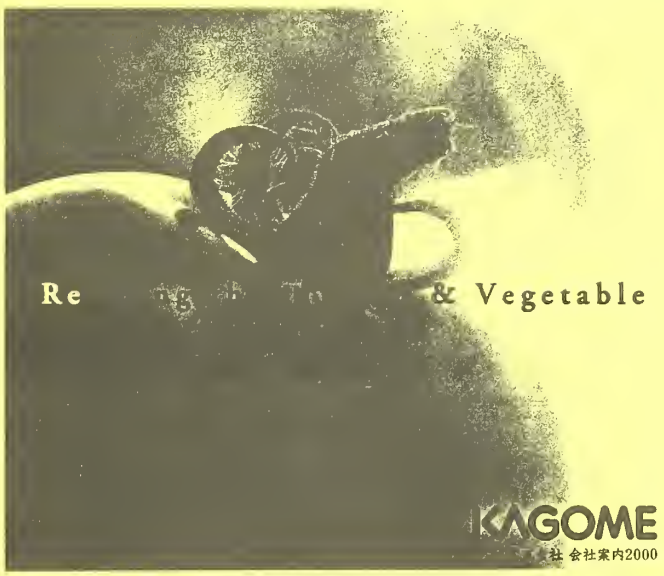
Total Functional Food Market = 8.0 billion $US (1998)
FOSHU health claim products = 2.0 billion $US (1999)

- Creative talents of food industry
- Adventurous nature of consumers
- Positive attitude of government

5.4 million Vending Machines in Japan…..or 1 for every 23 people

almonds are in

Italian Cuisine a Big Hit in Japan
Tomato Products & Lycopene Benefits Known



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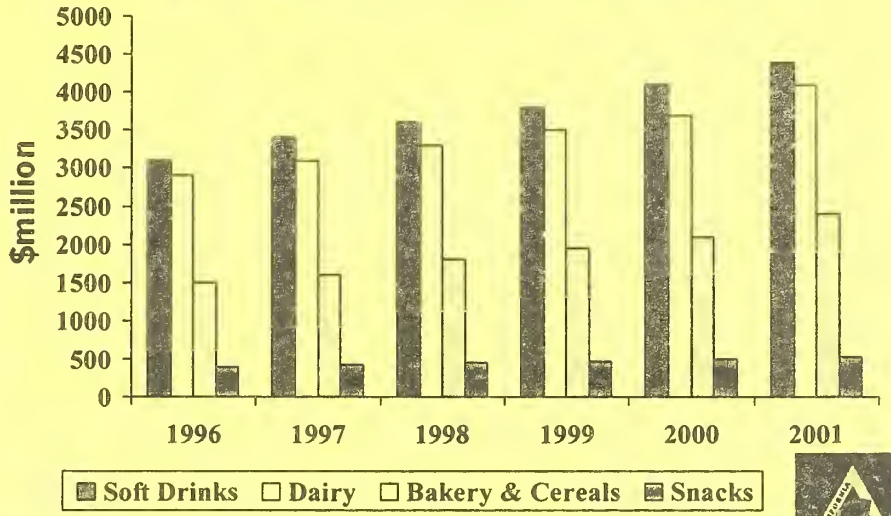
Antioxidant Health Benefits Well Known in Japan

US Retail Food Sales (1998) and Growth by Category ('97-'98)

	Fruit and Vegetable	Beverages	Others	Total
Natural/org. Foods ($bil)	**1.6**	**1.5**	**5.7**	**8.8**
'97-'98 Growth (%)	13.4	13.6		12.7
Functional Foods ($bil)	**0.0**	**4.9**	**9.9**	**14.8**
'97-'98 Growth (%)	0.0	12.0		8.1
Lesser Evil Foods ($bil)	**0.3**	**17.3**	**25.7**	**43.3**
'97-'98 Growth (%)	-0.1	0.4		1.9
Market Standard ($bil)	**76.7**	**54.7**	**254.7**	**386.1**
'97-'98 Growth (%)	2.1	-1.2		1.7
TOTAL ($bil)	**78.6**	**78.4**	**296.0**	**453.0**
'97-'98 Growth (%)	2.8	0.8		2.2

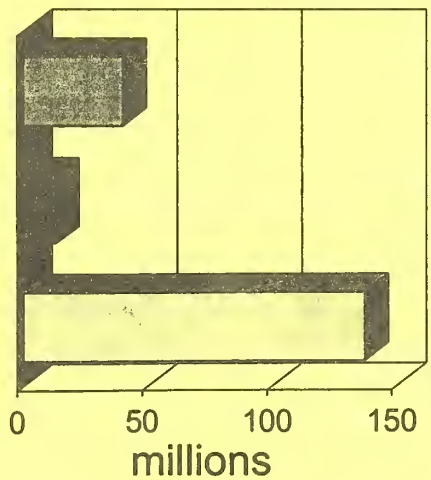
(Nutrition Business Journal, May 2000)

U.S. Functional Food Forecast by Market Sector, 1996-2001



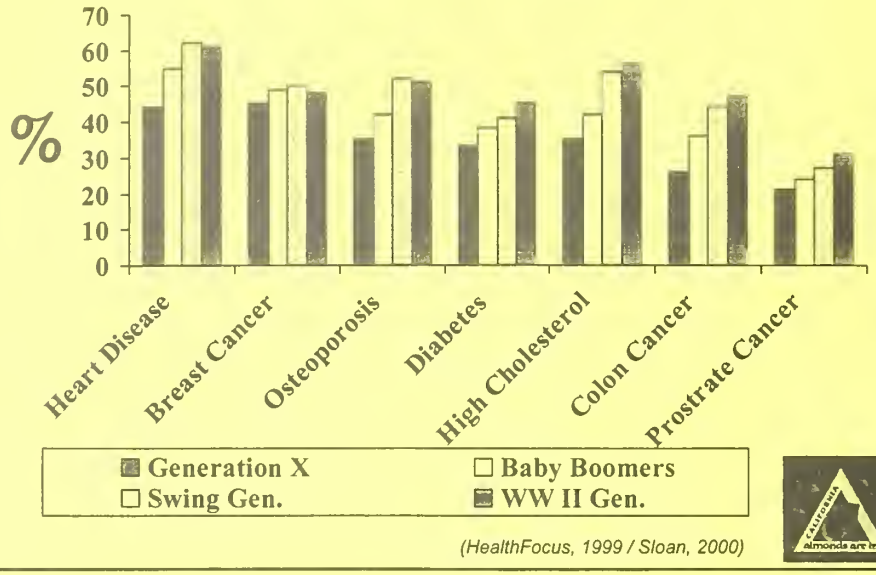
Source: Datamonitor Americas

Public Health Awareness of American Consumers



- **HEALTH ACTIVE**
  - Act today for the future
  - Eat fruit & exercise 2X/week
- **HEALTH AWARE**
  - Eat fruit & DO NOT exercise 2X/week
- **HEALTH UNINVOLVED**
  - Reactive and resist change
  - Episodic

Health Concerns With Age



(HealthFocus, 1999 / Sloan, 2000)

What do all these new terms mean ?

PHYTOCHEMICAL :

- **plant chemicals which have no known function in human nutrition but seem to have a variety of biological effects**

ANTIOXIDANT :

- **compounds that help protect the body from the potentially harmful effects of free radicals, ie. Vitamin C & E, and flavonoids**

Choose Your Vegetables Wisely

	% Of Total Fruits & Veggies Consumed	% of U.S. Adults Consuming The Item
Lettuce, iceberg	8.0	42
Tomatoes, raw	7.5	39
French Fries	4.7	16
Bananas	4.6	24
Orange Juice	4.6	23
Onions	2.9	18
Apples	2.7	15
Carrots	2.3	14

J. Brody, NY Times, 2001

Phytochemical –Rich Foods

	% Of Total Fruits & Veggies Consumed	% of U.S. Adults Consuming The Item
Grapes	0.9	6
Strawberries	0.7	5
Grapefruit	0.6	5
Broccoli	0.4	3
Spinach	0.2	2
Kale	0	0

Major Phenolic Compounds (flavonoids) found in fruits

(mg/100g FW)

Fruit	Total Phenolics
White wine	8/100 ml
Red wine	215/100 ml
Strawberry	85
Blueberry	340
Cranberry	290
Banana	150
Apple	50-1100

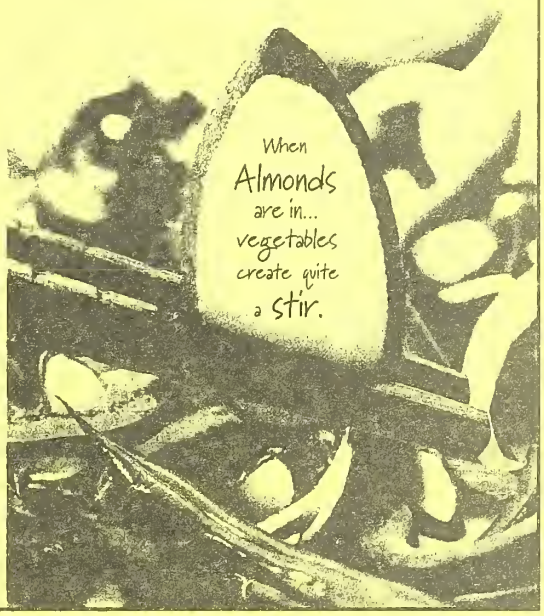
Promising Phytochemicals in Produce (mg/kg FW)

Substance	Source	Level
Quercitin	onions	284- 486
Kaempferol	parsley	45
Myricetin	spinach	37
Ficetin	strawberry	160
Liminene	lemons	34
Alpha-tocopherol	almonds	260
Anthocyanins	red grapes	8 - 388
Lycopene	tomato	150

What is Food Synergy ?

Does the combination of almonds as the leading whole food source of natural Vitamin E with the Vitamin C and flavonoid rich vegetables result in increased antioxidant activity and potential anti-cancer effects ???

Attend the PBH 1st Int. Conference on Food Synergy May 10-11 in DC to find out more !



USA Levels of Health Claims
(simplified)

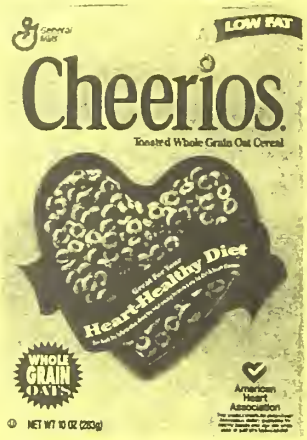
1. Product contains X.

2. X is good for you.

3. X helps maintain a healthy body structure/ function.

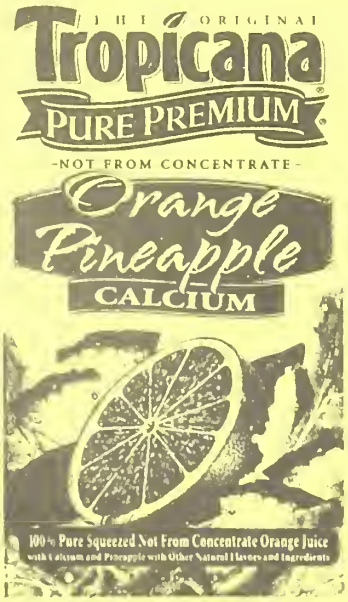
4. X reduces risk of a specific disease.

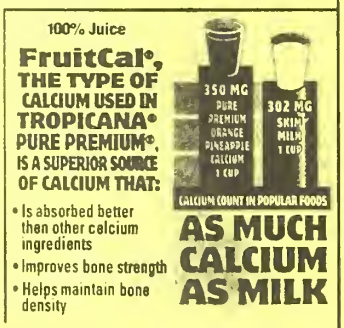
P. Barton Hutt,1999



1997 US - FDA First, Food-Specific, Generic, Health Claim

Structure/Function claim for Calcium





Nov. 2000 – FDA permitted Tropicana to make a health claim for pure orange juice based on potassium content ….and reduced risk of high blood pressure & stroke

ABSTRACT OF STUDY PRESENTED AT THE 71st SCIENTIFIC SESSION OF THE AMERICAN HEART ASSOCIATION, NOVEMBER 10, 1998, DALLAS, TX.

Purple Grape Juice Inhibits Platelet Function and Increases Platelet-Derived Nitric Oxide Release.

R. Sauter, Georgetown University Medical Center; J.D. Folts, University of Wisconsin-Madison; J.E. Freedman, Georgetown University Medial Center. *Circulation.* 1999;I-585.

Commercial Grape Juices Inhibit the In Vitro Oxidation of Human Low-Density Lipoproteins.

E.N. Frankel, C.A. Bosanek, A.S. Meyer, K. Silliman, L.L. Kirk. *Journal of Agricultural and Food Chemistry.* 1998;46(3): 834-838.

Purple Grape Juice Improves Endothelial Function and Reduces the Susceptibility of LDL Cholesterol to Oxidation in Patients With Coronary Heart Disease.*

J.H. Stein, J.G. Keevil, D.A. Wiebe, S. Aeschlimann, J.D. Folts. *Circulation.* 1999;100(10): 1050-1055.

Fruits & Flavor Fusion

Taste at the Forefront

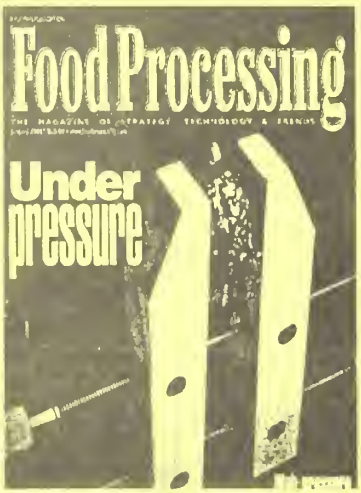
Bottle Those Trends

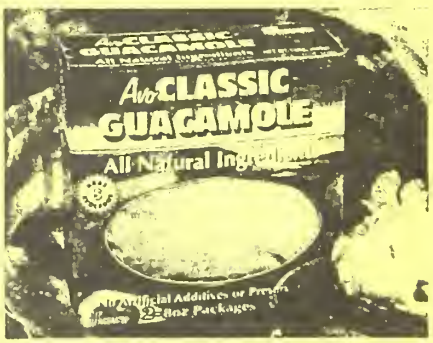
Flavours, Today's Alchemy

Americans versus Asians
mycophobic or mycophilic?

The magic of mushrooms

New Process for Better Quality & Safety

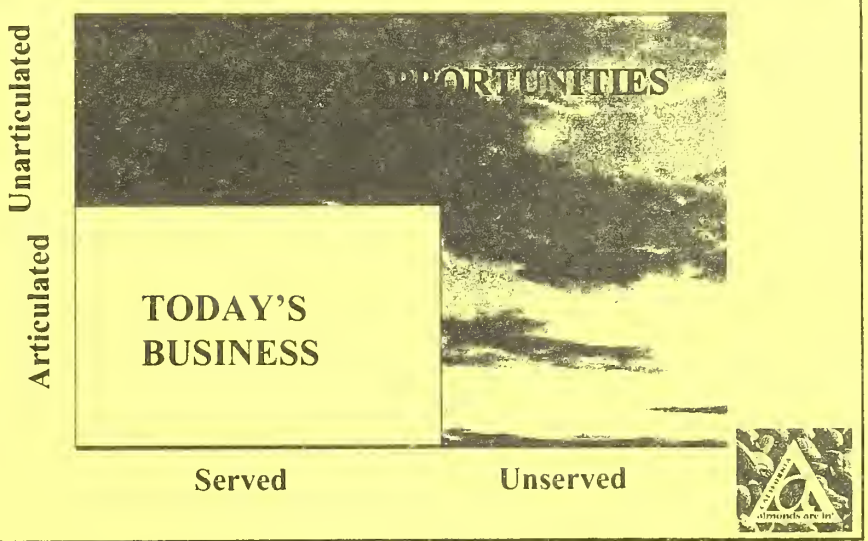




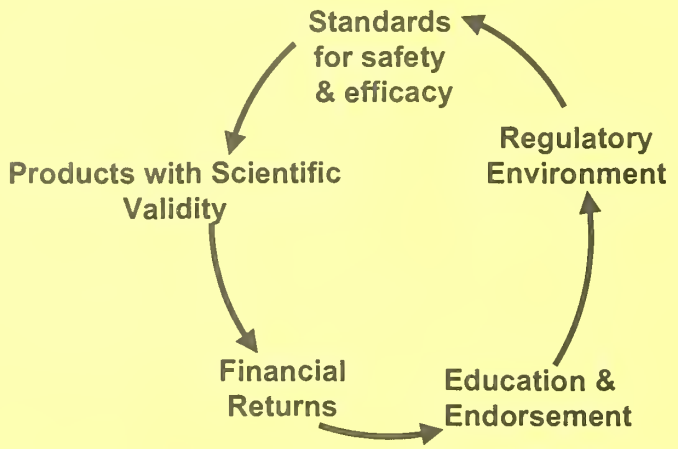
under **Pressure**

Healthy and Convenient

New Frontiers for Food and Health



Pathway to Move "Functional Food" Industry to Sustainable Growth



TOBACCO ISSUES: CONTRACTING AND USE OF TOBACCO SETTLEMENT PAYMENTS

Kelly Tiller
Assistant Professor
Agricultural Policy Analysis Center
The University of Tennessee

I have the privilege of talking with you today about some of the issues on the radar screens of tobacco growers and the tobacco industry. Keeping track of all of the moving targets on the already-full tobacco sector radar screen is about as confusing and overwhelming as grading tobacco seems to me.

Legal and Political Issues. Legal battles continue to rage against cigarette manufacturers with the fate of the $145 billion Engle judgment in Florida still in limbo and more than 500 other lawsuits active. Also hanging in the legal balance is the suit against cigarette manufacturers filed by tobacco growers and quota holders, with more than 6,000 plaintiffs on board and motions to be heard in a matter of days. The impact of the change in administration is still an unknown, as the Department of Justice suit against manufacturers appears to have lost momentum, but FDA authority over manufactured tobacco products and action on the upcoming President's Tobacco Commission recommendations are still on the radar screen.

Program/Marketing Issues. There are a number of hot buttons related to the tobacco program and marketing of tobacco, not the least of which is the widespread growth of contracting. Growers and quota owners went into the most recent round of program continuation referenda still reeling from large quota cuts over the last few years and skyrocketing quota lease costs. Growing pressures on the auction warehouse system, renewed interest in a quota buyout and licensing/permit system, and quality issues related to pool stocks are all unresolved issues.

Production/Grower Issues. Contracting, of course, is a major grower concern and several tobacco states are considering legislation establishing minimum contract standards. Recent infusions of payments to tobacco growers and quota owners through the National Tobacco Growers' Settlement Trust (Phase II) and the Tobacco Loss Assistance Program (TLAP) are affecting production and leasing decisions. Most of the major tobacco-growing states are also using a portion of their tobacco Master Settlement Agreement payments for programs targeting agriculture and tobacco producers. While it is still primarily a flue-cured issue, curing processes that reduce tobacco-specific nitrosamines are bringing to light a number of questions about crop quality and the role of stabilization.

Trade Issues. Declining exports of U.S. leaf, coupled with increasing imports of foreign leaf are major concerns in the industry, as is declining use of domestically produced leaf in U.S. cigarettes. Competitive pricing of U.S. leaf in international markets is an important issue. The trend toward increasing cigarette manufacturing capacity offshore is also a concern. The impact of the recent opening of China to tobacco trade remains to be determined.

Health and Product Issues. With domestic cigarette consumption declining, the impact of new products with lower tobacco-specific nitrosamines, reduced polycyclic aromatic hydrocarbon (PAH) compounds,

considered by many in the health community to be the most severe carcinogenic in cigarettes, and the prospect of new low-nicotine products remains to be seen. A number of questions about potential FDA authority, such as whether the product to be regulated is a cigarette or a drug delivery device, are being hotly debated. Health concerns are taking a more global twist, as the World Health Organization Framework Convention on Tobacco proceeds. Additionally, new medicinal and biopharmaceutical uses for transgenic tobacco are drawing considerable interest.

Obviously, we can't even scratch the surface of many of these issues in our time here today. Several of these issues are being covered by other speakers who will discuss the tobacco program and international trade. What I want to do today is at least make you aware of some of these issues and discuss more in depth two issues important to tobacco growers. First, I'd like to cover some of the issues associated with the widespread and rapid increase in the use of contracting in tobacco marketing, especially the longer-run economic impacts Second, I'd like to provide an update on the status of tobacco Master Settlement Agreement (MSA) payments to major tobacco states and also on the use of Phase II payments in major tobacco states, emphasizing the economic impacts of these payments on tobacco growers, quota owners, and agricultural communities.

Contracting

The idea of contracting U.S. tobacco is not a new one. Some specialty tobacco companies have a track record with contracting and smokeless tobacco types are often direct purchased. Some leaf dealers also purchase tobacco for export directly or through contracts with growers. Outside the U.S., marketing contracts, production contracts, and vertical integration are much more common for foreign-grown tobacco. USDA's Agricultural Marketing Service estimated in 1998 that about 80% of all flue-cured tobacco in the world was marketed under contract, and just over half of all world burley was marketed under contract. These arrangements have resulted in part from their lack of access to production inputs, capital, management skills, and technical assistance that are widely available in the U.S. But perhaps the largest influence on their wider use of contracting is lack of a tobacco supply control and price support program or other risk management tools.

In 1999, Philip Morris, the largest purchaser of U.S. leaf, introduced the idea of a program to purchase tobacco directly from growers, but did not implement the program. Also in 1999, several U.S. companies, including Star Scientific and R.J. Reynolds began contracting for flue-cured tobacco with lower tobacco-specific nitrosamines (TSNAs). Then in 2000, Philip Morris announced that they would offer pilot contracts to burley tobacco growers under their partnering program. It is estimated that just under one third of the 2000 burley crop was marketed under contract. Other companies further expanded their contracting programs and by late 2000, the largest purchaser, Philip Morris, announced that they would expand their burley direct purchase program and implement a similar contracting program to directly purchase flue-cured tobacco. By February, 2001, Philip Morris, R.J. Reynolds, Brown and Williamson, and Lorillard had announced that they plan to deal directly with farmers for all or part of their leaf purchases for the 2001 crop rather than purchase through auction warehouses. R.J. Reynolds intends to purchase all of the burley and flue-cured tobacco they will require through contracts; Philip Morris will supplement its contracts with warehouse purchases; Brown and Williamson will buy less than half of its tobacco through contracts, with the remainder to be purchased at auction; Lorillard plans to buy contracted leaf from Dimon.

Most of the tobacco contracts to date have been generally marketing contracts with some production guidelines, where the grower still bears the majority of production risks but reduces price risk. The contracts offered have been for a specified quantity of tobacco and have covered all of a grower's

production. The contracts offered have had options for a single year or a three-year contract period. The contracts specify origin, receiving, weighing, inspection, grading, price schedule and rejection terms. Contracted tobacco is still under the tobacco program, so that pounds deducted from the marketing card and no-net-costs are charged, but contract growers are not charged warehouse or grading fees.

Tobacco manufacturers have a number of incentives for movement toward contract production and marketing arrangements. Primarily, a contracting system would allow better control over the specific grades, characteristics, and qualities of tobaccos that the companies desire, especially as the quantity of tobacco produced declines due to reduced quotas. Over time, a contract system could provide growers incentive (quality-related price premiums) to increase tobacco quality. A contract system would also speed the adoption of technological changes, especially important as technologies to lower TSNAs, reduce PAH compounds, and lower nicotine concentrations are emerging. In the event of FDA regulation over manufactured tobacco products, a contracting system would allow tighter management control over leaf inputs and would provide accountability for the raw leaf purchased.

Contracts are pervasive in many sectors of U.S. agriculture. According to USDA's 1998 ARMS data, more than one third of the value of all agriculture was produced under contract. Production contracts accounted for $27 billion (14%) of all agriculture value and marketing contracts accounted for $40 billion (21%). In 1998, 95% of all poultry value was produced under contract and about half of all fruit, dairy, cotton, and vegetable value was produced or marketed under contract. But some of the producer advantages of contract arrangements in these sectors are not applicable to the tobacco sector. Primarily, contracts allow producers to share price and/or production risks with the contractor. Additionally, they may provide guaranteed market access, improve efficiency, provide access to inputs, capital, technical and managerial advice, help producers manage cash flow, and provide income stability. But none of these are significant problems in the tobacco sector, almost entirely due to the existence of the federal tobacco program. For decades, the tobacco program has provided easy access to ready-made markets and a very high degree of price stability. As a tradeoff for price stability, the program induces quota or quantity instability, although the quota-restricted higher program prices have made tobacco a profitable enterprise despite variability in quota.

While the existence of the tobacco program has made contracts generally less appealing to tobacco growers than producers in other agricultural sectors, widespread and rapid increase in the use of tobacco contracts raises a number of questions about the future of the federal tobacco program. The program is costly to operate and introduces production and marketing inefficiencies. As the current contracting system expands, the ability of the auction system to continue to support the USDA grading service is in question. It is also possible that the auction system could become an outlet for residual, lower quality tobacco, further pressuring no-net-cost assessments. The relationship between auction market prices and contract prices is unclear. Also floating are questions about quota enforcement and collection of assessments.

The economic impacts of widespread movement toward contracting are very different within and without a tobacco supply control and price support program. Within the current tobacco program, growers' cost savings from contracts are eventually passed on to the quota owner (who, of course, is often not the tobacco grower) through higher quota lease costs. As quality improves, buyers' cost savings are eventually translated into higher tobacco quotas. With or without a tobacco program, it is unclear to whom contracts will be awarded in the long run. The number of growers, the size of their operations, and their location will become clearer as contracting and the program evolve over the next few growing seasons.

Without a tobacco program in place, cost savings from the marketing of tobacco are transferred to buyers. Eventually, as quality increases, buyers' cost savings are translated into larger quantities purchased, although in the long run, there is little economic justification for confining tobacco production to traditional tobacco belts. Without a tobacco program, contract growers would bear contract-specific risks such as the risk of growing tobacco that doesn't meet quality standards, risk of not having contracts renewed, and investment and income risk. The degree of competition among buyers and leaf dealers for contracts is uncertain, but many growers fear a lack of competition based on their perceptions of a lack of competition among purchasers within the current auction system. Also, small yield fluctuations could make it difficult for contract producers to cover costs of production as contract prices approach the cost of production without a guaranteed program price to compete with contract prices. While lower-priced leaf under a contract marketing system without a tobacco program would make U.S. leaf more competitive in export markets, it is unclear whether there would be sufficient competition among buyers and leaf dealers to ensure global competitiveness. It is unclear whether a contract system can serve buyers not purchasing all stalk positions as well as an auction system with a stabilization factor. Also, absence of government-enforced contract disclosure requirements could weaken market signals and competition.

Agriculture-Related Uses of Tobacco MSA Payments

Cigarette manufacturers reached a settlement with 46 states over state claims against the tobacco industry on November 23, 1998, committing manufacturers to pay participating states $206 billion over the next 25 years, although the exact amount of future settlement payments is uncertain as payments are subject to annual adjustments for changes in cigarette consumption, inflation, and other factors. The tobacco Master Settlement Agreement (MSA) places no restrictions on state spending of settlement payments. Terms of the settlement direct payments to each state's general fund. Thus, decisions regarding spending state tobacco settlement funds generally rest with state legislatures. All 43 states that have made decisions about spending settlement dollars have allocated some portion to health priorities. Most of the states (38 of the 43) have allocated some settlement monies to tobacco use prevention and reduction. Other health uses include programs for the elderly, prescription drugs, Medicaid, research and chronic diseases. Many states have also allocated money toward education uses including scholarships, school construction, technology, and literacy, among others. Most of the major tobacco-producing states have targeted some portion of their MSA payments to programs related to agriculture and/or rural communities. The following section describes the use of MSA payments in major tobacco states, especially uses targeting tobacco growers and agricultural development.

North Carolina. North Carolina expects to receive about $4.6 billion in MSA payments over the first 25 years covered by the settlement. To date, North Carolina has received about $200 million in MSA payments. Legislation was passed and signed into law in 1999 establishing a non-profit corporation for economic assistance to tobacco dependent communities (the Golden LEAF Foundation) with 50 percent of the state's MSA payments. The other half of the payments are to be divided equally between two trust funds: one for tobacco producers, quota holders and tobacco workers and the other for health-related interests. Golden LEAF has just finished the first round of grants awarding more than $5 million to 39 projects including alternative crops, education, research, economic development, and alternative employment. Most of these monies will target the eastern flue-cured region, although significant funding will also go to the western burley region. Uses for the 25% of settlement fund payments allocated to the Tobacco Trust Fund have not been determined, but possible uses include assisting tobacco farmers in converting curing barns to reduce nitrosamines or giving college scholarships to children of tobacco farmers.

Kentucky. Kentucky expects to receive about $3.5 billion in MSA payments over 25 years and has received about $150 million to date. In 2000, the General Assembly voted to allocate 50 percent of all settlement funds through 2002 to agriculture, 25 percent to early childhood development programs and 25 percent to health initiatives, with $69 million reserved for a "Bucks for Brains" education endowment. Of the $180 million expected in the agriculture fund through 2002, $40 million will ensure a minimum support level under Phase II. $49 million will be available to county ag councils for local uses, such as low interest loans, grants for water line extensions, transitioning to other farm enterprises, and environmental stewardship. The remaining $91 million allocated for statewide ag development projects will benefit agriculture by developing regional farm markets, supporting small farm diversification, sharing some of the costs of complying with the state water quality plan and other environmental targets, providing municipal water in prime agricultural areas, and developing farmland preservation programs.

Tennessee. Tennessee expects to receive $4.8 billion in MSA payments over the first 25 years covered by the settlement and has received over $200 million to date. In 2000, the Tennessee legislature decided to split current payments between two funds: one for health and one for agriculture. Legislative committees for each fund have recently made spending recommendations to the General Assembly. The agriculture committee is recommending that about $60 million be used to fund agricultural development programs—in the areas of (1) alternative agricultural development, (2) agribusiness and industrial infrastructure, (3) creation/expansion of agricultural processing facilities, (4) agricultural marketing development, and (5) agricultural production efficiency and effectiveness—and educational financial assistance programs. They are further recommending that half of all future MSA payments to the state go to an agriculture fund trust with investment income eligible for expenditure in the same program areas. They also recommend securitization of the future income stream. The legislature will take up the issue this spring and expects the recommended uses to compete with using the money to avoid a projected budget shortfall.

Virginia. Virginia expects to receive $4 billion over the next 25 years from the MSA and has received $167 million through December 2000. Virginia passed legislation in early 1999 allocating 50 percent of all settlement payments to a Tobacco Indemnification and Community Revitalization Fund with a governing board that will compensate tobacco farmers for loss of assets and promote economic growth in tobacco dependent communities. The same legislation allocates 10 percent of settlement payments to a youth tobacco use prevention program. The remaining 40% is allocated annually by the legislature and the governor has recently proposed securitization of this portion. In 1999 and 2000, $62 million of the payments to the Tobacco Fund went to direct payments to more than 42,000 growers and quota owners. Initial grants from the remaining Tobacco Fund include $6 million to seven community colleges in Southwest Virginia, $11.6 million to Virginia Tech to develop an institute for research of plant and animal genetics, $2 million to research on medicinal and other uses for tobacco, and the remainder to fund economic development projects in Southwest and Southside Virginia.

South Carolina. South Carolina's legislature approved a plan allocating the majority (73%) of their expected $2.3 billion MSA payments (about $100 million received to date) to health care, including prescription drugs, home and community based care for the elderly, newborn health screenings, and youth smoking prevention. 15% was allocated to compensate tobacco growers and quota holders for production losses, and 12% was allocated for water and sewer infrastructure improvements, primarily in rural areas. The state is planning to securitize their expected future settlement payments and is reviewing securitization proposals.

Other States. Georgia's legislature approved a plan allocating payments through fiscal year 2001 to rural economic development and health priorities. One third of the settlement payments, $62 million, was appropriated under the One Georgia Fund to four rural economic development projects (funded at $10 million each) designed to attract businesses to south Georgia and $22 million was reserved for future economic development needs. Maryland has committed $11 million from their expected settlement payments to a buy-out program for tobacco growers. The buy-out pays growers $1 per pound annually for the next ten years for every pound of tobacco in their average annual yield for 1996-98. In return, tobacco growers agree to stop growing tobacco and are required to continue farming alternative crops. The average annual payment is about $11,000, but varies greatly. Four farmers have received buyout payments to date and around 650 farmers (which is 68% of the state's tobacco farmers) have so far applied to participate. The state expects participation to increase substantially and may require additional funding over the ten year period. The legislature is considering a bond issue backed by settlement funds to pay for the buyout up front rather than spread over 10 years. Ohio has decided to allocate 2.3% of their settlement funds for the next 12 years, or about $229 million over 12 years, to tobacco farmers and their communities. While Florida settled their lawsuit with cigarette manufacturers outside the MSA, they have considered using a small portion of their settlement funds to assist tobacco producing regions.

Uses of Phase II Payments in Major Tobacco States

The Master Settlement Agreement contained language that called for participating manufacturers to meet with representatives of major tobacco producing states to come up with a plan to help compensate tobacco growers and quota holders for declining tobacco consumption and demand resulting from the settlement. The result was establishment of the National Tobacco Growers' Settlement Trust Fund, which has come to be known as "Phase II" of the tobacco settlement. Phase II calls for participating cigarette manufacturers to pay $5.15 billion into a national tobacco grower trust over 12 years to be distributed among tobacco-growing states based on each state's share of 1998 tobacco quotas.

Phase II funds may only be used to make direct payments to tobacco quota holders and producers who suffer economic losses due to industry settlement of state lawsuits. Funds cannot be used for agricultural development, warehousers, or any purpose other than payments directly to quota owners and growers. Payments are only for quotas of tobacco types used in domestic cigarettes. According to the agreement, each participating state is responsible for establishing a board to distribute funds among eligible tobacco quota holders and growers. The allocation of funds among the state's quota owners and growers (including owners, lessees, and tenants) is determined by each individual state board. In flue-cured regions, state boards have generally split payments evenly between growers and quota owners. In burley regions, payments have generally been weighted more heavily toward growers or those bearing a larger share of financial risk. The following section describes the status of the Phase II payments in major tobacco states.

North Carolina. Payments to North Carolina flue-cured producers are split 50/50 between growers and quota owners based on lost quota in the payment year. Payments to burley producers are also split 50/50 between growers and quota owners with growers paid based on pounds actually marketed in the previous year and quota owners paid based on pounds of lost quota in the payments year. Payments in 1999 totaled $140 million and were distributed to over 100,000 farmers. Payments in 2000 were about $92 million. North Carolina expects to receive just under $2 billion under Phase II over the 12 year period.

Kentucky. In Kentucky, payments are divided equally among the quota owner, grower/tenant of the quota, and the growing farm. In 1999 and 2000, the quota owner payment was based on basic quota in the previous year. Payments to growing farms and growers/tenants were based on the average of the previous year marketings and effective quota. Future Phase II payments to Kentucky's growing farms and growers/tenants will be based on the 1998-2000 production history, averaging effective quota and marketings. Payments to quota owners will be based on basic quota owned as of July 2000. The changes in the formula resulted from the experience that anticipation of the Phase II payments drove up quota lease prices and that Phase II payments were viewed by some growers as a way to stay in tobacco production rather than assistance in transitioning out of tobacco. In 1999, Kentucky distributed about $109 million in Phase II funds. Although only $84 million in Phase II funds were available to Kentucky in 2000, the legislature allocated an additional $40 million from their MSA payments to supplement Phase II payments so that they will remain at a consistent level around $114 million.

Tennessee. Tennessee decided to allocate 80% of Phase II payments to tobacco growers and 20% to quota owners. Payments to quota owners are based on basic quota in the previous year and payments to growers are based on actual marketings in the previous year. In 1999, Tennessee distributed nearly $29 million in Phase II payments to more than 68,000 tobacco growers and quota owners. Payments for 2000 were nearly $19 million. Total Phase II payments are expected to be $390 million over the 12 year period. The state's Phase II board is considering fixing future payments to a benchmark average of quota and marketings to reduce the transfer of payments from growers to quota owners through higher quota lease costs.

Virginia. Flue-cured growers and quota owners in Virginia each receive half of their Phase II flue-cured payments with payments based on basic quota in 1998. Burley growers receive 75% of Virginia's Phase II burley payments with payments based on the average of effective quota and marketings in 1998. The other 25% of the burley Phase II payments are paid to burley quota owners based on basic quota in 1998. The base year will remain fixed at 1998 through 2004. Virginia expects to receive $357 million in Phase II payments over 12 years.

Other States. Phase II payments in South Carolina and Georgia are split 50/50 between flue-cured growers and quota owners. Payments to Georgia quota owners and growers and to South Carolina quota owners are based on basic quota in the previous year. Payments to South Carolina growers are based on actual marketings in the previous year. Each state distributed over $20 million to more than 10,000 growers and quota owners in 1999 and over $15 million in 2000. South Carolina expects $339 million over the 12 year period and Georgia expects about $300 million. In addition to the six major tobacco producing states, eight other states—Ohio, Indiana, Florida, Maryland, Pennsylvania, Missouri, West Virginia, and Alabama—share just over 5% of all Phase II payments.

Agricultural Outlook Forum 2001

Presented: Friday, February 23, 2001

IMPLICATIONS OF STRUCTURAL CHANGE FOR FARMS AND RURAL ECONOMICS

Stanley R. Johnson
Vice Provost for Extension
Iowa State University

1. Introduction

The structural change in rural America that has occurred over the past decades has created significant pressures for farms and rural economies. In part, this is because the rural communities were built to serve an agriculture that is no more. The evolving structure of agriculture has effected the economic base for rural communities, and the adjustments in these communities are conditioning the future of farms and agriculture. In short, there is much interdependence between the farms and rural communities and in their responses to the pressures of change. We will focus on what seem to be the major factors contributing to these pressures and speculate on how the adaptation processes will/can evolve. The factors identified are technology, globalization, place policy, and infrastructure.

The adaptations to the pressures of change are all conditioned by path dependence, the future depends on the way we have evolved and our current circumstances. The idea of starting from some point in the past, say the 1950s farm and rural setting, may be attractive but, in fact, is largely irrelevant to adaptation strategies by individuals, local governmental and nongovernmental groups and the national and other policy makers. A good example is the current farming system which is conditioned to produce for government subsidies rather than the market. Communities and farms have an endowment of culture and assets that have evolved over time and that will condition how they adapt to external pressures. Unfortunately, in the case of both farms and rural communities, the history seems not to have provided particularly good preparation for a promising future.

For both farms and rural communities, the agricultural policy of the past 70 years has provided essential support but has left baggage that represents a challenge for the future. It is now broadly recognized that these farm policies and the idea that they work in the favor of a vibrant rural economy are in serious question. Our policies to subsidize agriculture have resulted in transfers mostly capitalized into land prices. But much of the land is not owned by farmers or even the residents of rural communities. And, this is an increasing trend. At the same time there are powerful constituency groups that have organized to support the continuation of the existing farm policy framework and the associated subsidies. Rural economies have been disadvantaged by the view that their interests are somehow looked after by the USDA, which is in reality an agency controlled by farmers. Interests of farmers are not necessarily those of the rural communities--and in the current farm policy framework increasingly divergent.

Agricultural and rural policy are at an important crossroad. The common interests of the farmers and the rural communities in the context of the current farm policy framework are more and more not the same. In fact, the main connection may be the link between the subsidies for farms and the land price. Rural communities depend on property taxes for the public services. A radical change in agriculture policy eliminating subsidies would reduce land prices and the tax revenues of the rural communities--at least in

the short run. At the same time, the nearly $70 billion in farm USDA subsidies that has been transferred over the past three years would have been used very differently if the primary objective would have been to increase the economic opportunity in rural communities and grow the rural economy. The long assumed coincidence between the economy of rural America and farm income is a reality in but a very few of the predominantly agricultural counties, perhaps less than ten percent.

2. Pressures for Change

There are, of course, many factors involved in the pressures for change of farming and the rural economy. The four selected are important, but have been identified mainly to illustrate their differing impacts on farms and the rural economy. Understanding these impacts may provide insights on the ways that the economies and the farms will adapt. Again, the processes of adaptation of farms and of the rural communities have interactions, often at a more subtle level than is at first apparent. There are as well many impacts of the pressures of structural change, since the farms and rural communities are an integrated part of it. The four factors that we have selected emphasize the divergent interests and responses of farms and broader rural economy.

Technology

Perhaps the major features of the trends in technology for agriculture and farming are productivity and scalability. Productivity of crop (and more recently animal) production has increased consistently over the past decades. Moreover, these technologies if we include management and administration, have not been scale neutral. The result has been rapid growth in farm size and a decreased necessity for a rural economic structure that is designed to serve many small farmers. Agriculture or farming as an economic base of the rural economy has declined. Agricultural policy has been friendly to this change in farm size. At the same time, the technology in other industries (providing access by rural residents to opportunities in urban economies) has resulted in an out migration of economically mobile populations. The result is rural communities declining and with the diminished demands for servicing agriculture, and that have lost many of their most talented residents.

The spiral of decline in rural communities and of the rural economy is in part due to this selective process of migration. The populations left behind are less well educated and have lower entrepreneurial inclination. Also, there is less local competition among the talented component of the population that remains. All of this limits the possibilities for growth and diversity of the economic base in rural relative to the urban areas. Populations may accept lower wages or other remuneration because they want to stay in rural areas. This is an attraction for firms looking to lower production costs. But at the same time, because of urban opportunity, the kind of human resources in rural areas that are available at relatively low remuneration cost are not highly skilled. The result is attractiveness to industries that may depend on agriculture but that demand relatively low skills.

One of the responses to this systemic set of changes has been to provide policy incentives to support the development of so-called value-added agriculture. The focus has been not on primary product differentiation, but on upstream processing and distribution. Unfortunately, the value-added agriculture industry of this type is generally capital or low wage labor intensive. While this fits the labor force that is evolving in the rural communities, it does not bring high-quality jobs. Moreover, the capital is often owned by those outside the community or rural economy. The result is that the payments for this factor (frequently the most important) in many cases, go directly out of the rural economy--just as the high rents that result from agricultural subsidies go to absentee landowners.

For this and other reasons value-added agriculture, a possible common interest of farmers and the other participants of the rural economy, has not turned out to be the panacea that was first envisioned. Many states and even the federal government cling to upstream value-added agriculture as a hope for improving the rural economy mainly because they seem not to have any better ideas. As will be argued, there is hope for this strategy, but not with a value creation system based on commodity agriculture.

Globalization

Globalization is often identified as a problem for the development of rural economies and for farmers. This is at the very least questionable. Globalization means that consumers are increasingly more accessible and diverse. These consumers have different tastes and preferences. Possibilities for product differentiation are increased. In fact, this is more commonly observed for agricultural production and for the farm sector. Globalization also means that resources, capital and labor, flow more freely to the industry sectors and locations with higher rates of return. Finally, globalization increases the possibility for specialization and division of labor. All of these can work in favor of localities and industries that are prepared to respond and or are not provided disincentives to respond by out dated government policies.

Globalization has not benefited agriculture and farming as it might have because the United States agricultural policy in many ways insulates the farmers from the market. The incentive is for high levels of production of commodities" -- not specialized "products." The latter is the way to respond to diverse consumer demands and to take advantage of the returns to product differentiation. This is a particularly interesting possibility for improving farm incomes in ways that do not tie the capitalization of the increased profit/gross margins to land prices. The scarce factor in this case is the systems necessary to produce and deliver the differentiated product, likely tied more to the personal assets and the specialized investments involved.

Globalization has a similar potential for the rural economy. Again the possibilities associated with the information technologies and the institutions that have supported the emergence of the global economy are at the heart of the situation. Expanded demand for differentiated products is more easily expressed and served. The potential for serving these markets at scales of production that are achievable in rural communities is greatly expanded.

The requirements for succeeding in the global arena are entrepreneurial abilities, the skills to understand and exploit the emerging market niches and associated risk taking. Again the U.S. farm policy history is at odds with success. Farmers, and to an extent the communities that serve them, have enjoyed programs that transfer and/or subsidize risk. The culture is thus in many ways not one that makes it likely that the rural areas and economy will be able to fully exploit the opportunities of globalization. Thus, globalization may have a negative effect on rural economies, but not due to the condition of freer and more open markets. Instead, it is related to the path by which the rural economies came to the circumstances that they find themselves in today.

Place Policy

The income and price and the environmental policies directed to farms make up much of what is a de facto rural place policy in the United States. Rural areas are places with features that are recognized by those who live there (and by those who might wish to live in rural areas) as important elements in the decision calculus of location choice. The fact that rural place policy has been dominated by farm interests may have greatly disadvantaged rural areas. In addition to farm policies, the suite of other policies for rural areas has been heavily influenced by agricultural interests. Examples are abundant and include

transport/roads, river and barge traffic and zoning. The problem is that the future of these communities depends on their capability as places to attract new populations that can lead their future.

The kinds of residents that can lead rural economies and communities to a better future and/or reverse the secular decline in the economic status of rural compared to urban populations are from the segments of the population that can choose where to live. That is, these are the populations that are mobile and in a more connected globalized economy can look after their personal economic interests wherever they decide to live. These populations are well educated, entrepreneurial and often have capital and other resources. We know that they like to live in communities that are vibrant, that have physical texture, that offer opportunity to become involved in community life (have social capital in the view of some scholars) and that have other amenities unique to their location.

Farm, environmental and other rural policies are more than not at cross purposes with these aspects of the rural communities/economies. Public access to farm land taken out of row coop production, trees along the roadways, open access and trails, a welcoming feeling among community organizations, high-quality of water and air, and other attributes of the local environment are, in many instances, inconsistent with the themes of existing farm and environmental policies. Rural communities will have to have a greater awareness of place and be more sensitive to the place demands of the populations they want to attract, if they are to be successful in growing their economics and decreasing the economic discrepancy between their residents and the residents of urban areas.

The sense of place also extends to diversity. Often rural communities are not welcoming to new populations that are of different ethnicity or origin. This has potentially a very negative feel to populations that the communities want to attract. Many of these populations have/are living in urban areas where diversity is appreciated and celebrated. What this means is that the very culture of rural communities may have to change to make them attractive to the kinds of residents that can be the engine for future growth. This may be complicated by the fact that many of the rural communities have high percentages of older age populations, likely not to be overly interested in dramatic cultural change.

Infrastructure

Two aspects of the infrastructure of rural communities are particularly limiting to growth of farming and the local economy. These are the age or condition of the existing infrastructure and the infrastructure required for access. In the former case, most of the rural communities in the United States are more than a century of age. Their infrastructure has been in place for 50 or more years; i.e., water, sewers, schools, streets, electricity, telecommunications, etc. Much of this infrastructure is in need of replacement or upgrading. Most communities have not planned for the future in terms of escrow accounts for replacement. They have simply used up the capital. How will this infrastructure be upgraded and replaced? The major source of local finance is the property tax. In small-size communities, this may mean high taxes for poor services. Of course, the high property taxes contribute to higher costs of production, disadvantaging farms.

For access, the popular emphasis is on telecommunications, but there are other aspects; air service, public transport, etc. The growth area for business is services. High-end services require access to high-speed broadband telecommunications and other forms of connectedness. These are simply not currently available at competitive prices in most rural communities. The result is a limit on the forms of business that find rural communities to be attractive as locations, and as important limitations on the attractiveness of the communities to the populations with the capacity to lead the growth of the economy. Many of these key population segments are young families with children. Are they going to move to communities

with low-quality high-cost telecommunications services, limited access to public transportation, and that have high hidden costs in terms of infrastructure restitution?

The natural inclination of some communities is to look to state support. But the cost of upgrading and replacing community infrastructure on a state-wide basis is prohibitive. This means that some selectivity in the support of communities will be a part of the related interventions. As well, these rural communities may be not at the scale that the services can be efficiently supplied. There are clear economies of size for communities. This is particularly the case with schools and with public utility services. Maintaining the small inefficient size communities will be high cost to the state and federal government, and to the local residents.

The cost of infrastructure raises a more complicated political problem for rural areas. The available data on rural states show that on average, all of the economic and population growth during the past several decades has occurred in urban counties. Moreover, the rural counties that have grown are almost all near urban areas or areas with special natural attractions. If the strategy of a state is to grow, why not invest to make the urban areas more attractive? Having more attractive urban areas than neighboring states may be an effective economic and development policy. Farms also may benefit from these policies. The concentration of customers in urban markets makes it possible to diversify agriculture and develop in ways that may open possibilities for serving the greater global market. These kinds of enterprise usually start on a small scale, the kind that is typical of periurban agriculture.

3. Choices for Farmers, the Rural Economy and Policy Makers

The review of the pressures of selected structural changes and the economic condition of farms and rural communities suggests that more of the same, whether for farming strategies, community economic development approaches or rural and agricultural policy, will not lead to the outcomes preferred by many. Different sets of choices will have to be made at the individual/firm, community and at higher government levels. In many instances, these choices will involve risk, if for no other reason that they move away from the customs and trends of the past. We are conditioned by our history and the current situation, but we do not have to perpetuate the structural change and current economic conditions by repeating past unfortunate choices.

Farms

Farmers and those who craft farm policy must recognize that the global economy is at hand. In the related markets, product differentiation and appeal to the high-end segments of the market represents opportunity for improved economic status and fits with the economic interests of the rural communities within which the farms are located. Quality management systems, supply networks that maintain identity preservation, branding to reflect the special but not easily observed characteristics of products and, in general, the shift form commodity to product agriculture is an area of real opportunity for the United States. Many of the requirements for this kind of agriculture are in place--well educated farmers, high investments in infrastructure for assembly and handling of agricultural products, and information and communication systems that can support specialized markets and market access. Not unrelated is the opportunity that is presented by the failed attempts to introduce specialized crops, e.g., GMOs into systems in which quality control has not been a priority.

Product agriculture and related farming system may yield new opportunities for rural communities. First, the production systems for these specialized products are likely of smaller scale. Second, the characteristics of the products may include, for example, the fact that they have been grown and

processed with some type of environmental integrity. Third, the branding may reflect an identification with the community or region. All of this supports the concept of enhancement of rural communities as places--making them more attractive to the populations that can help them grow and develop. Fourth, this type of agriculture fits with the emerging patterns of growth in rural areas. Populations are becoming more clustered in and around urban areas. The related local markets are ideal places for incubation of the product agriculture and agribusiness.

Farm policy must not provide disincentives for this new direction of United States agriculture. There must be a change for the commodity focus of agricultural policy to one that embraces the new product agriculture. Greater emphasis on training, education and research as compared to income subsidies seems to be the direction. Also, stronger emphasis on environmental management approaches that are sensitive to the rural landscape and its improvement are likely components of a product agriculture friendly policy. It may be that an attractive place of production and processing is the way to identify a product that can command a premium from consumers.

Not many proposals for farm policy appear to be on the table that support this vision of the future for U.S. agriculture. Perhaps this is because the policies we have evolved try to serve too many objectives with too few instruments. If the objective is the economic welfare of the farmers, why not use the tried and tested instruments of welfare policy--means testing, retraining, transition support, and limited access. If the objective is industry development, again why not use the tired and tested types of policies--education and technical assistance, incubation, risk sharing, measures to address various types of market failures, and attention to regulatory and other processes that limit innovation and new product development. If the objective is quality of environment, why not again use the tried and tested policies--regional environmental initiatives, approaches that feature the quality of the rural landscape, results versus process (the preoccupation with best practices is a good example of how not to do it), and amenities. Not accidentally, this approach to environmental policy is quite consistent with the enhancement of rural communities as places.

The policy environment is important but equally critical to the development of a new agriculture is the culture and momentum of the past. This is, of course, reflected in the political difficulty of major policy change. The whole set of ideas about property rights and farms may have to be reassessed. We provide one example. In Europe, the concept of living parks has gained acceptance and is growing in importance to farm and the rural economy. The idea is to use the mechanism of a park to capture the distinctiveness of an area and its history and culture and to make access available to the public. Farmers and rural communities benefit from the influx of people who want to experience these unique aspects of the landscape, and from the differentiation that this landscape provides for the farm products. The communities benefit from the efforts to make them special, building on their differences and unique attributes. The result is a market response that improves the economic lot of both the residents and the visitors to the working parks.

These and other types of innovators need to be a part of a grand national experiment that will help the farms in the United States become more prosperous and sustainable. One size will not fit all communities or farming systems. This was apparent as a result of an agriculture futuring conference we held at Iowa State University last year. What came from the conference was that the farms in Iowa are increasingly different--large farms that produce commodities and take advantage of scale, part-time farms that have owners that obtain most of their income from other occupations, specialized farms that are developing to serve the segmented markets by differentiating their products, and farms that are in transition with owners moving out of agriculture. We need an agricultural policy that serves all of these farms, and one that causes these differences to be an attribute to the farmers and the communities in which they live.

Communities and the Rural Economy

The move to a more product-oriented agriculture will bring the interests of farmers and rural communities more in line, but differently than in the past. Still, there are pressures of the structural change that more directly impact communities and call for changes in the policies of the communities themselves and the policy environment in which they operate. We will think of these in two ways, related to the public sector and the private sector. For the public sector, the question is how can the communities be made more competitive, both in terms of attracting the kinds of populations that can make a better future, and in terms of efficiency of the public services provided. For the private sector, the issue is the presence of market failures that may especially disadvantage the rural areas/economies and what can be done to mitigate them locally and on higher governmental levels.

For the public sector, there is the hard reality of size economies that the rural and smaller communities have to face. Public services, other things equal, can be provided at lower cost in larger communities. This implies at least the idea of smaller community cooperation in the provision of public services. Of course, this has already occurred with school consolidation, for example. But there is an increasing question about how other service provision can be consolidated--including the governance structures. At the extreme, there is the possibility that the state and federal policies can provide incentives to consolidate the communities into larger size developments. This has been happening as a part of the decline in most rural areas.

Thus, the themes for the public sector imply coordination and other means to take advantage of the scale economies, making the communities competitive in the supply of public services. In the case of attracting and holding residents, the scale issue is present as well. Communities and local economies are attractive because among other things they supply private services. Here again there is the issue of scale and/or the size of the local market that can sustain the private services sector. The themes are the same as for the public sector, cooperation and consolidation to address in this case the size of market issues.

All of the discussion of consolidation whether due to economies for public services or market scale for privately provided services has abstracted to this point from the actions that might be taken to develop communities that are attractive from the viewpoint of amenities. There are other things that communities can do to differentiate themselves. Interestingly, this is a globalization response much like the one for product as compared to commodity agriculture. It is also a strategy that can give residents a different reason for selection of location--and may work to reduce the importance placed on the cost of public services and the availability of a broad set of private services. Uniqueness is a strong attraction and can be addressed from the aspect of physical appearance, community vitality and culture, or other avenues. The issue is place differentiation.

For the private sector, there is as well the issue of market failures and how they can be addressed. In this case, we will focus on industrial firms instead of the service sector discussed above, although the issue is still with some kind of market failure. How can smaller rural communities attract, hold and grow firms that can be a part of a more diverse economic base? What market failures are related to the apparent inability to grow and diversify as do their urban counterparts? We know that firms locate to be close to low-cost inputs, including raw product, labor, capital, and packaging and other requirements of the finished product. The value-added agriculture efforts have many times not focused on the latter, which in many instances are the high cost items. The places to look for market failures are local capital markets, market access, resources to support start ups, thin choices of suppliers due to location, etc. These are often location specific, and require careful assessments of the functioning of the local markets if interventions are to be successful. Local communities can do something about services competitiveness and uniqueness/differentiation. It is more difficult and tricky to address market failures of the type that may influence the economic base.

Farm and Rural Policy

To an extent, these policy issues have already been addressed implicitly in the discussions of approaches to adjustment by farms and communities/local economies. Thus, we will be brief. The current agricultural policy does not reinforce the opportunities in the global market that are associated with product differentiation. It is also not a rural development policy. It uses a blunt and high-cost set of instruments to meet a complex of objectives. There is reason to reassess this policy. It is high cost and not achieving the started societal objectives. Starting from a clear set of objectives and using tried and tested instruments from other policy arenas seems a good starting place, and would lead to a far different farm policy for U. S. agriculture.

A rural policy needs to be fashioned. The discrepancy between opportunity, broadly defined, between residents of rural and urban locations cries out for attention. This policy must reflect the global market place just as is the case for farm policy. And, one of the features that stands out as an opportunity is differentiation--another way to think of place as a key element of rural policy. The rural communities must also be ready to make the changes that can lead to increased competitiveness. Other things equal, who would choose to live in a place with high-cost public services and limited private services? Perhaps the policy area that has attracted the most attention is the most difficult--the market failures that are in place which lead to a narrow or limited economic base for rural areas. If one has confidence in the private sector, fixing the other problems of rural communities may be the easy way to broaden and expand the economic base.

4 . Concluding Observations

Pressures of structural change are becoming more intense for farmers and for the rural economy. Both for farming and for the rural communities/economies, different and more targeted policies at the Federal and state levels will be required. We have all seen enough of the outcome of the current farm policy to come to the conclusion that it takes us down an undesirable path for both agriculture and rural communities/economies. And, the global and other conditions that are causing the current farm policy do not deliver are not likely to change. The day is at hand for real innovative thinking on farm and rural policy and for some real political leadership in setting in place a basic change in policy. To date, this has not been evident in the emerging dialogue on the new Farm Bill and/or in the emerging discussion of a more coherent and scientifically justified rural policy. There is a possibility of a new synergy. There is a possibility of a new synergy between rural economy and farm policy, if there is a focus on the global market and product/community differentiation as the key to future success.

Implications of Structural Change for Farms and Rural Economics

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USDA Agricultural Outlook Forum 2001

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